ENGINE - V6 S/C 3.0L PETROL

SPECIFICATIONS

Engine Data

ENGINE DESCRIPTION	ENGINE CAPACITY	MAXIMUM ENGINE TORQUE (EEC) (SAE)	MAXIMUM ENGINE POWER (EEC) (SAE)	COMPRESSION RATIO	BORE	STROKE
• 90° "Vee" • 6 Cylinder • 24 Valves	2.995 ccm	450 Nm at 3.500 - 5.000 RPM	250 kW at 6.500 RPM	10.5 ± 0.50	84.5 ± 0.000 mm	89 ± 0.0 mm

Engine Firing Order

FIRING ORDER
1:4:2:5:3:6

Engine Valve Clearance (cold)

INTAKE VALVE (MM)	EXHAUST VALVE (MM)
0.18 - 0.22	0.23 - 0.27

Spark Plugs

SPECIFICATION	SPARK PLUG GAP
SILZKAR7C-10S	0.9 - 1.0 mm

Lubricants, Fluids, Sealers and Adhesives

cardiagn.com

NOTE:

When servicing or draining the engine oil, the 0w20 oil is compatible with 5w20. Any residue mix is acceptable.

DESCRIPTION	SPECIFICATION
Engine Oil - Vehicles built up to 2015	SAE 5W20 WSS-M2C925-A **or** SAE 0W20 STJLR.51.5122
Engine Oil - Vehicles built from 2015	SAE 0W20 STJLR.51.5122
Sealant	WSE-M4G323-A6
Core plug and stub pipe retainer	WSK-M2G349-A7
Jaguar Premium Cooling System Fluid	WSS-M97B44-D

Capacities

DESCRIPTION	LITRES
Engine oil, initial fill	8.75
Engine oil, service fill with oil filter change	7.25
Engine oil, service fill without oil filter change	6.75

Cylinder Head and Valve Train

ITEM	SPECIFICATION
Cylinder head **maximum** permitted warp (flatness specification)	0.2 mm (0.008 in)
Valve guide inner diameter (mm)	5.51 ± 0.01
Intake valve effective length (mm) (tip to gauge line)	117.58 ± 0.10
Exhaust valve effective length (mm) (tip to gauge line)	94.75 ± 0.10
Valve stem to guide clearance intake diametrical (mm)	0.042 - 0.057
Valve stem to guide clearance exhaust diametrical (mm)	0.060 - 0.075

cardiagn.com

Valve head diameter intake (mm)	31.6-Overall diameter-33 ± 0.10
Valve head diameter exhaust (mm)	26-Overall diameter-28 ± 0.10
Intake valve face angle (degrees)	44.875 ± 0.125
Exhaust valve face angle (degrees)	44° 52' 30" ± 7' 30"
Valve stem diameter intake (mm)	5.4705 ± 0.0075
Valve stem diameter exhaust (mm)	5.4525 ± 0.0075
Valve spring free length (mm) - inlet	46.1
Valve spring free length (mm) - exhaust	46.1
Valve spring installed height (mm) - inlet	36.78
Valve spring installed height (mm) - exhaust	37.07
Camshaft lobe lift intake (mm)	10
Camshaft lobe lift exhaust (mm)	9.36
Camshaft journal to cylinder head bearing surface clearance diametrical (mm)	0.025 - 0.065
Camshaft journal diameter - all positions	26.965 ± 0.01
Bearing diameter - all positions	27.01 ± 0.01
Camshaft journal maximum run out limit (mm)	
Camshaft journals to end journals	0.03
Camshaft journals to adjacent journals	0.015
Camshaft journal maximum out of round (mm) - all journals	0.005
Crankshaft end play (mm)	0.15 - 0.35

Crankshaft Pin and Bearing

NOTE:

Make sure that the crankshaft pin journal classification number is noted correctly, so that the correct bearing is installed.

cardiagn.com

CRANKSHAFT PIN DIAMETER BEARING SIZE (MM)	CRANKSHAFT PIN LETTER
55.982 - 55.988	A - G
55.989 - 55.994	H - N
55.995 - 56.000	P - W
Crankshaft Pin Letter	**Color**
A - G	Brown/Yellow (Part Number - DX23-6211-BFA)
H - N	Brown/Red (Part Number - DX23-6211-BEA)
P - W	Brown/Blue (Part Number - DX23-6211-BDA)

Torque Specification

NOTE:

A = Refer to procedure for correct torque sequence.

DESCRIPTION	NM	LB-FT	LB-IN
Engine cover mounting bolts	10	7	88
Accessory drive belt tensioner retaining bolt	40	30	354
Supercharger belt idler/tensioner bracket retaining bolts	25	18	221
Secondary drive belt idler retaining bolts	40	30	354
Power steering pump pulley retaining bolts	25	18	221
Power steering pump retaining bolts	25	18	221
Power steering pump bracket to engine retaining bolts	25	18	221
Generator retaining bolts	48	35	425
Starter motor retaining bolts	48	35	425

cardiagn.com

Air conditioning compressor retaining bolts	25	18	221
Engine mounting to engine mounting bracket retaining nuts	48	35	425
Engine mounting to subframe retaining nuts	63	46	558
Engine mounting bracket to engine retaining bolts	48	35	425
Crankshaft damper pulley retaining LH threaded bolt	200 + 270°	148 + 270°	1770 + 270°
Flexplate retaining bolts	45 + 90°	33 + 90°	398 + 90°
Exhaust manifold heat shield retaining bolts	A	-	-
Exhaust manifold retaining bolts	A	-	-
Engine wiring harness bracket retaining bolts	10	7	88
Coolant outlet pipe	10	7	88
Intercooler retaining bolts	25	18	221
Intake manifold retaining bolts	25	18	221
Oil Cooler retaining bolts	13	10	115
Knock sensor (KS) retaining bolt	20	14	177
Ignition coil retaining bolts	8	-	71
Spark plugs	20	15	177
Fuel rail retaining bolts	A	-	-
High pressure fuel pipe retaining bolts	A	-	-
High pressure fuel pump retaining bolts	12	9	106
Oil filter housing assembly retaining bolts	12	9	106
Oil filter cap	28	21	248
Lifting eye bolts	25 + 90°	18 + 90°	221 + 90°
Manifold absolute pressure and temperature (MAPT) sensor sensor retaining bolts	5	-	44
Coolant pump retaining bolts	12	9	106
Variable valve timing (VVT) oil control solenoid retaining bolts	10	7	88

cardiagn.com

Camshaft position (CMP) sensor retaining bolts	10	7	88
Camshaft cover retaining bolts	13	10	115
Front upper timing cover retaining bolts	12	9	106
Front lower timing cover retaining bolts	A	-	-
Engine rear cover retaining bolts	A	-	-
VVT to camshaft retaining bolts	32	24	283
Camshaft bearing caps retaining bolts	11	8	97
Primary timing chain fixed guide retaining bolts	12	9	106
Primary timing chain tensioner retaining bolts	12	9	106
Primary timing chain tensioner guide blade retaining bolts	25	18	221
Auxiliary chain tensioner guide retaining bolts	21	15	186
Auxiliary chain fixed guide retaining bolt	12	9	106
Oil pump sprocket retaining bolt	25	18	221
Cylinder head retaining bolts	A	-	-
Engine oil level (EOL) sensor retaining bolt	12	9	106
Oil pan to oil sump body retaining bolts	12	9	106
Oil sump body to engine retaining bolts	25	18	221
Oil pan drain plug	24	17	212
Oil transfer tube to Oil pan body retaining bolts	11	8	97
Oil pump to engine block retaining bolts	25	18	221
Pick-up pipe to oil pump retaining bolts	12	9	106
Windage tray retaining bolts	25	18	221
Piston cooling jet retaining bolts	12	9	106
Engine block coolant draining plug	50	37	442
Balance shaft assembly retaining bolts	25 + 90°	18 + 90°	221 + 90°-
Rear balance weight assembly retaining nuts	25 + 38°	18 + 38°	221 + 38°
Rear balance weight assembly chain bracket retaining bolt	25	18	221

cardiagn.com

Connecting rod bolts	20 + 125°	14 + 125°	177 + 125°

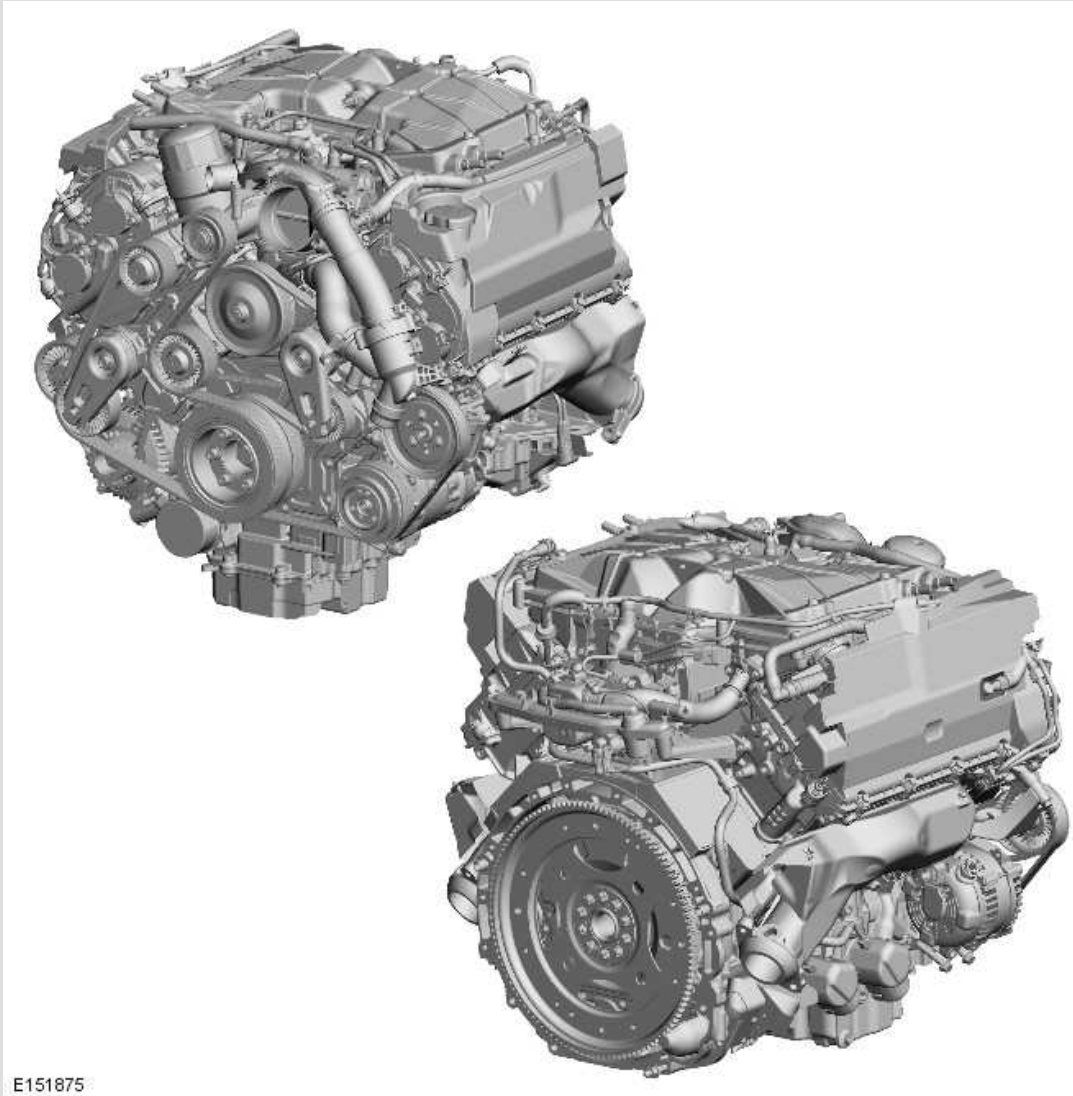
cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

DESCRIPTION AND OPERATION

COMPONENT LOCATION



E151875

OVERVIEW

cardiagn.com

The V6 3.0L S/C Petrol engine is a liquid cooled V6 unit featuring direct fuel injection, four overhead camshafts and four valves per cylinder.

Two power versions are available. The power variants are achieved by software changes within the ECM (engine control module) . Both engines use the same components.

The main structural components of the engine are all manufactured from aluminum alloy. The engine is built around a very stiff, lightweight, enclosed V, deep skirt cylinder block. A structural windage tray is bolted to the bottom of the cylinder block to further improve the block stiffness, minimize NVH (noise, vibration and harshness) and help reduce oil foaming. To further enhance the stiffness of the lower engine structure, a heavily ribbed sump body is installed. The sump body also helps to reduce engine noise.

The engine uses a Bosch high pressure direct injection fuel system with fuel pressure provided by two, cam driven high pressure fuel pumps which are driven by a dedicated camshaft. The high pressure fuel pumps supply the fuel rails which in turn supply the three injectors for that bank with fuel at a controlled pressure.

The four camshafts incorporate VCT (variable camshaft timing) . VCT allows the timing of the intake and exhaust valves to be adjusted independently of each other. The VCT system is controlled by the Bosch ECM using information from CMP (camshaft position) sensors.

The supercharger is located in the 'vee' of the engine and is driven from the crankshaft by a dedicated secondary auxiliary drive belt.

The engine meets EU5 emission regulations in Europe and Rest of World (ROW) and ULEV 70 emission regulations in North American Specification (NAS) markets.

The direct fuel injection system, advanced piston and combustion chamber design and the SC (supercharger) provide improved fuel consumption and emissions.

cardiagn.com

Various engine systems are located on the engine assembly and driven directly and indirectly by the engine operation. Refer to relevant section for the further information:

Engine cooling
For additional information, refer to: Engine Cooling (303-03A Engine Cooling - V6 S/C 3.0L Petrol, Description and Operation).

Supercharger cooling
For additional information, refer to: Supercharger Cooling (303-03 Supercharger Cooling - V6 S/C 3.0L Petrol, Description and Operation).

Fuel system
For additional information, refer to: Fuel Charging and Controls (303-04A Fuel Charging and Controls - V6 S/C 3.0L Petrol, Description and Operation) /
Fuel Tank and Lines (310-01A Fuel Tank and Lines - V6 S/C 3.0L Petrol, Description and Operation).

Accessory drive
For additional information, refer to: Accessory Drive (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Description and Operation).

Starting system
For additional information, refer to: Starting System (303-06A Starting System - V6 S/C 3.0L Petrol, Description and Operation).

Electronic engine controls
For additional information, refer to: Electronic Engine Controls (303-14A Electronic Engine Controls - V6 S/C 3.0L Petrol, Description and Operation).

TECHNICAL SPECIFICATIONS

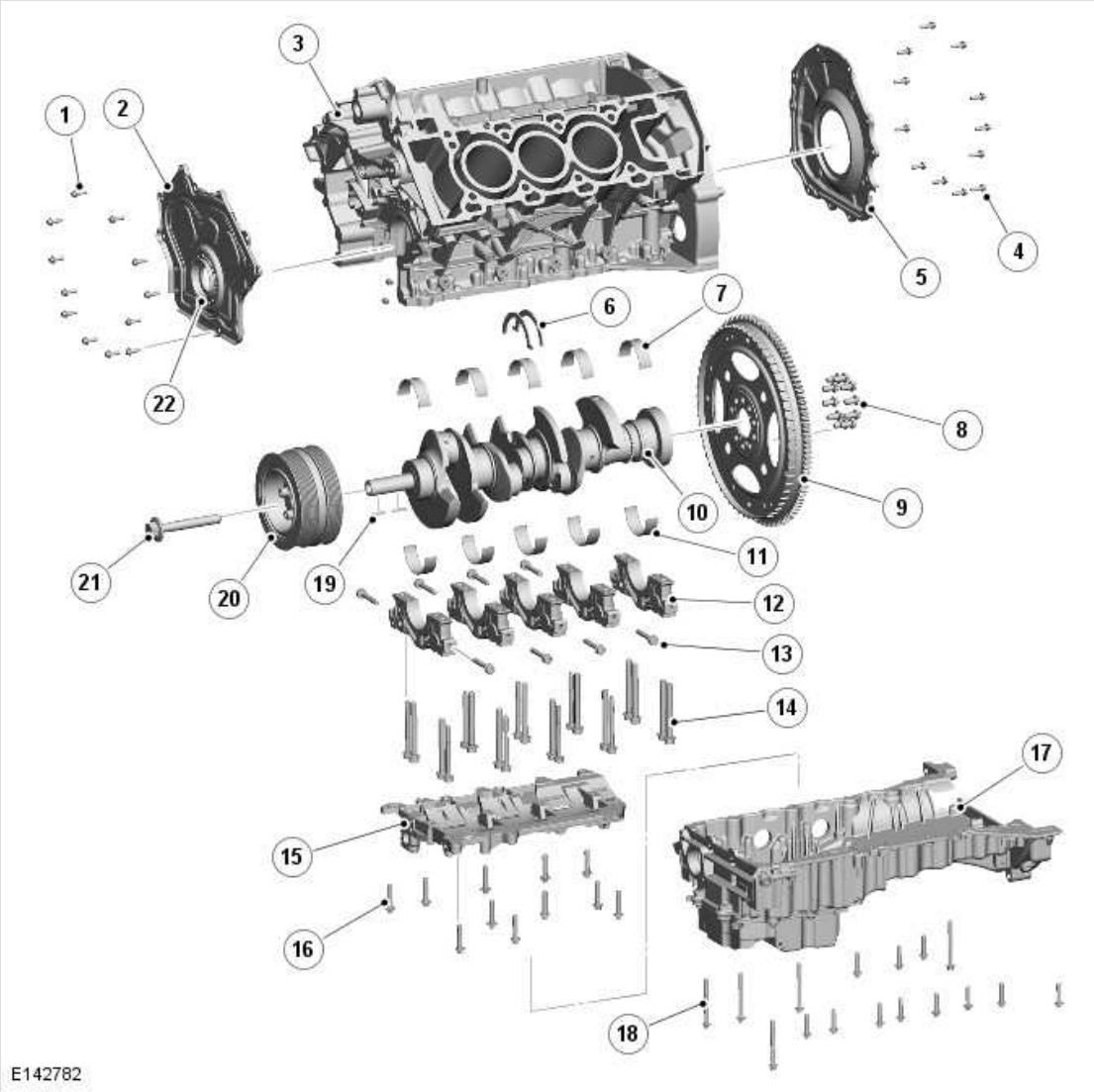
DESCRIPTION	SPECIFICATION - 340PS	SPECIFICATION - 380PS
Configuration	90° 'V' configuration 6 cylinder	90° 'V' configuration 6 cylinder
Displacement	2995 cc	2995 cc

cardiagn.com

Bore and Stroke	84.5 X 89 mm	84.5 X 89 mm
Maximum Power	340 PS @ 6500 RPM	380 PS @ 6500 RPM
Maximum Torque	450 Nm @ 3500 - 5000 RPM	460 Nm @ 3500 - 5000 RPM
Compression Ration	10.5:1	10.5:1

CYLINDER BLOCK - DESCRIPTION

CYLINDER BLOCK COMPONENTS



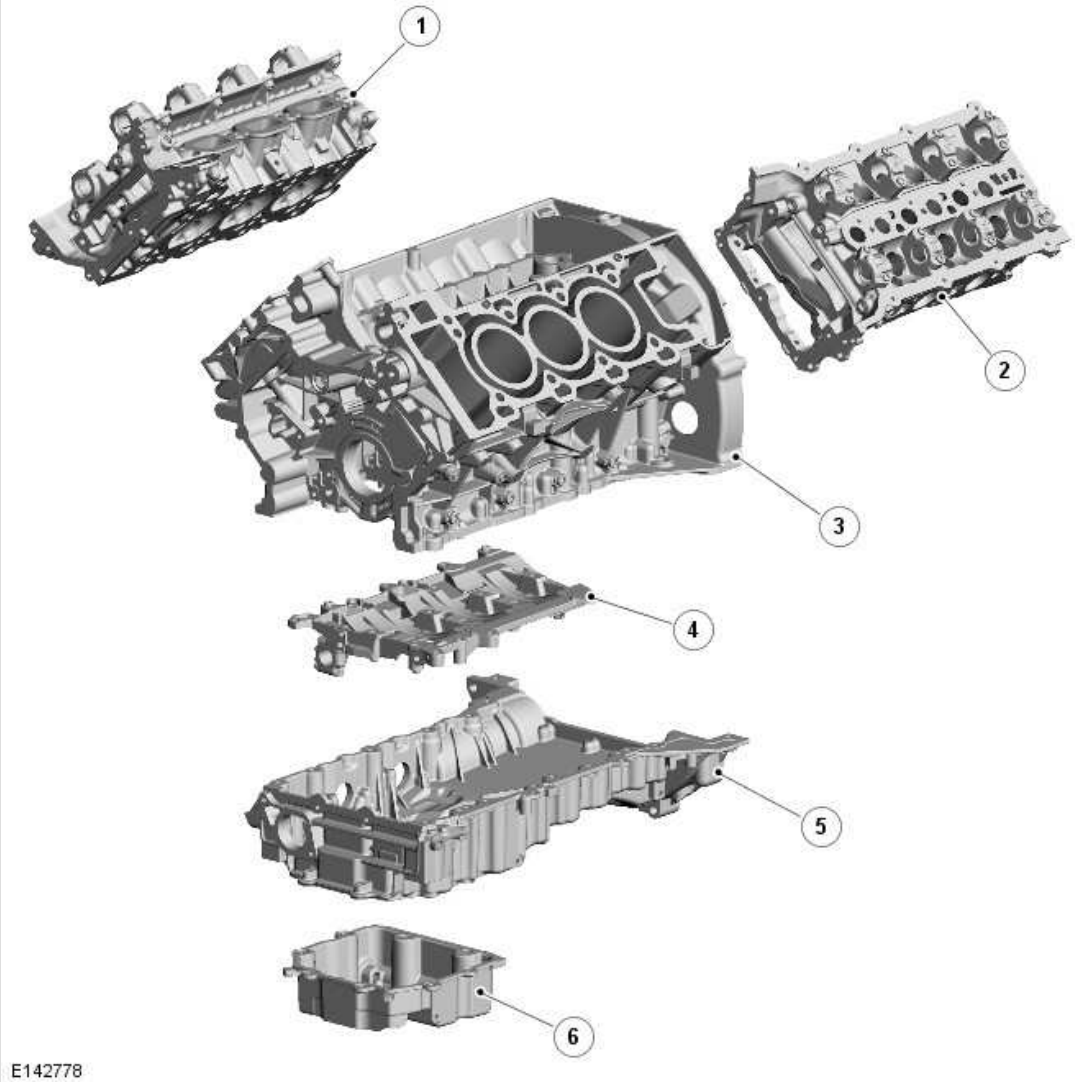
ITEM	DESCRIPTION
1	M6 bolt (12 off)
2	Cylinder block front cover

cardiagn.com

3	Cylinder block
4	M6 bolt (12 off)
5	Cylinder block rear cover and oil seal
6	Thrust washer (2 off)
7	Upper main bearing (5 off)
8	Bolt (10 off)
9	Drive plate
10	Crankshaft
11	Lower main bearing (5 off)
12	Crankshaft main bearing cap (5 off)
13	Cross bolt - crankshaft main bearing cap
14	Inner and outer bolts - crankshaft main bearing cap (20 off)
15	Windage tray
16	M8 bolt (11 off)
17	Oil pan
18	M8 bolt (16 off)
19	Woodruff key (2 off)
20	Crankshaft pulley/vibration damper assembly
21	Crankshaft damper bolt
22	Crankshaft front oil seal

MAJOR STRUCTURAL COMPONENTS

cardiagn.com

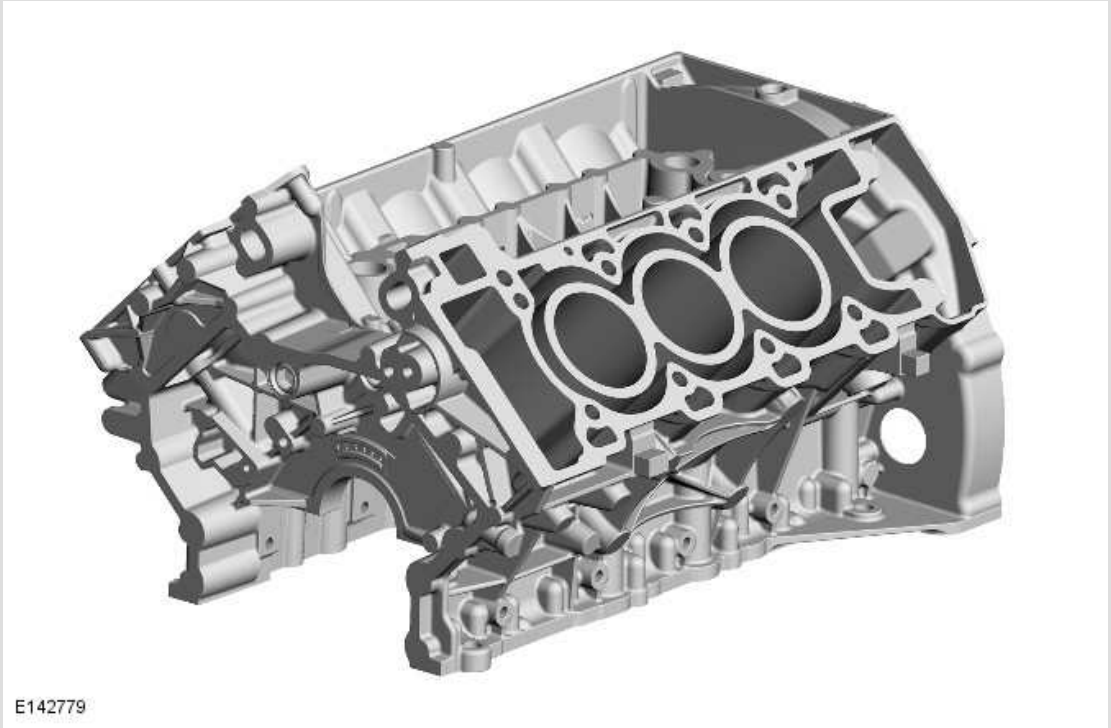


ITEM	DESCRIPTION
1	Right cylinder head (bank 1)
2	Left cylinder head (bank 2)
3	Cylinder block

cardiagn.com

4	Windage tray
5	Oil pan body
6	Oil pan

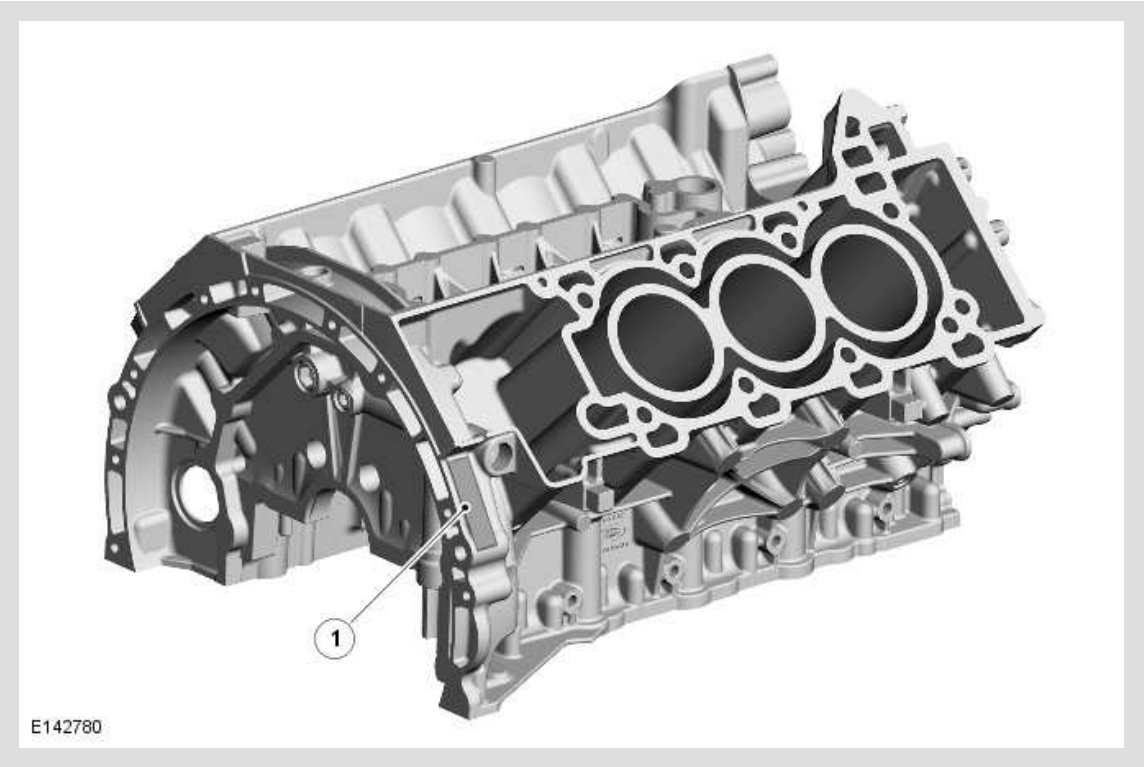
CYLINDER BLOCK



The high pressure die-cast aluminum cylinder block is a 90 degree configuration with cast-in iron cylinder liners and an open deck die-cast coolant jacket. The low volume coolant jacket gives good warm-up times and low piston noise levels. The longitudinal flow design of the coolant jacket, with a single cylinder head coolant transfer port in each bank, provides good rigidity and head gasket sealing.

ENGINE DATA LOCATION

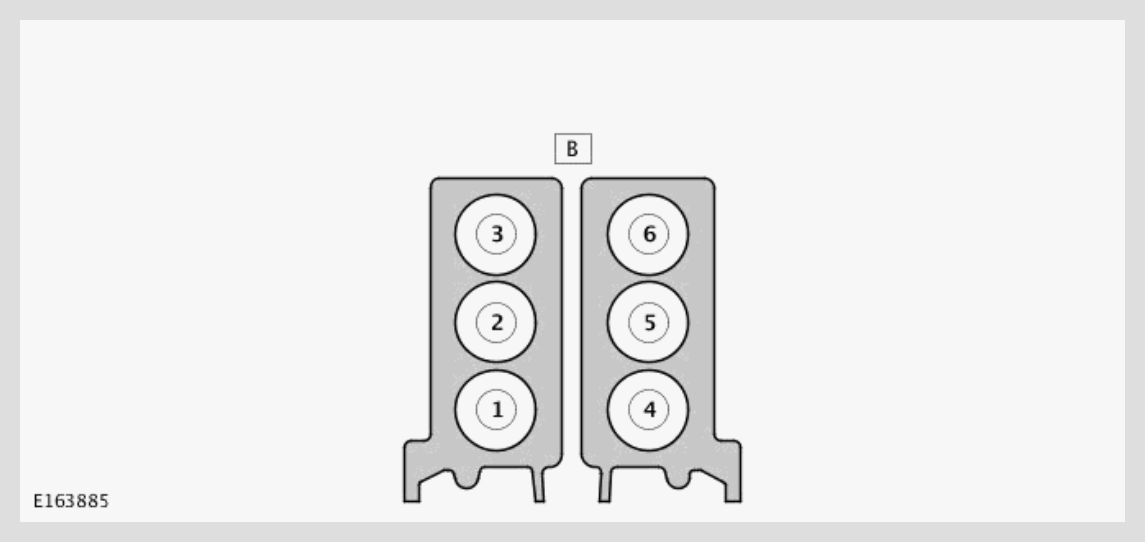
cardiagn.com



ITEM	DESCRIPTION
1	Engine data location

CYLINDER NUMBERING

cardiagn.com

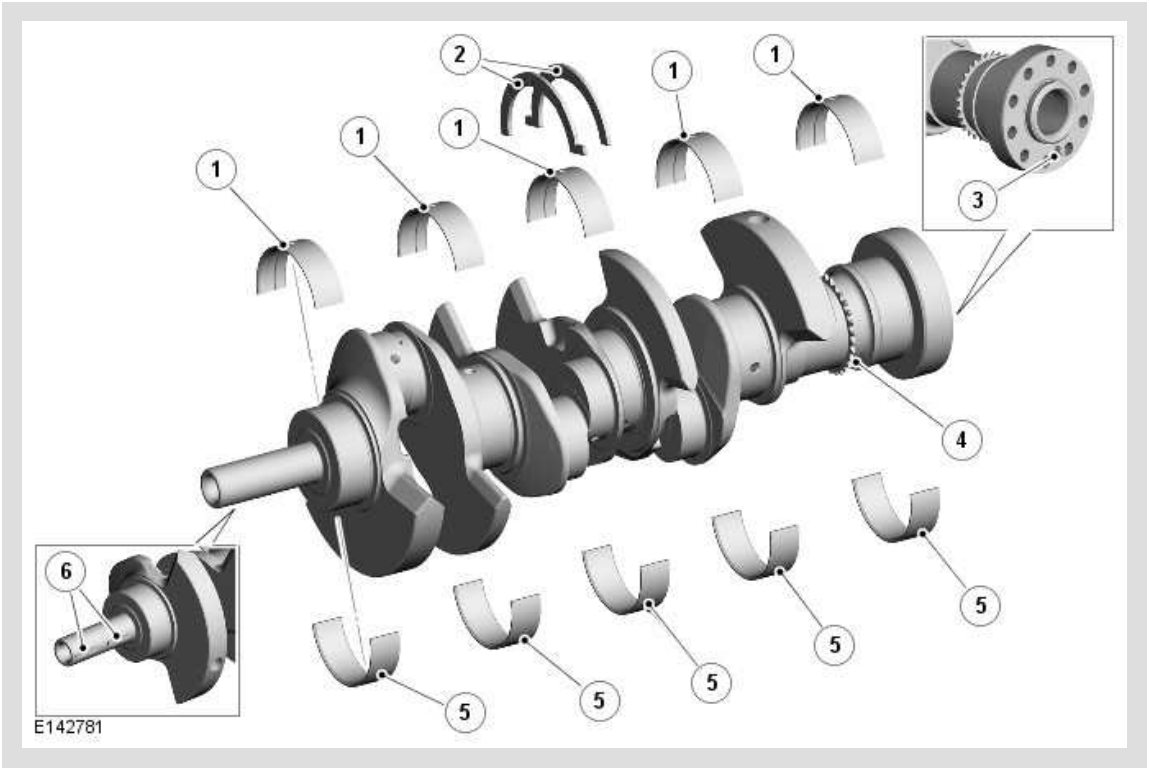


ITEM	DESCRIPTION
A	DIN standard cylinder numbering

DIN cylinder firing order 1,4,2,5,3,6

CRANKSHAFT

cardiagn.com



ITEM	DESCRIPTION
1	Upper main bearing (5 off)
2	Thrust washer (2 off)
3	Drive plate location dowel
4	Rear dynamic balancer drive sprocket
5	Lower main bearing (5 off)
6	Woodruff key locations

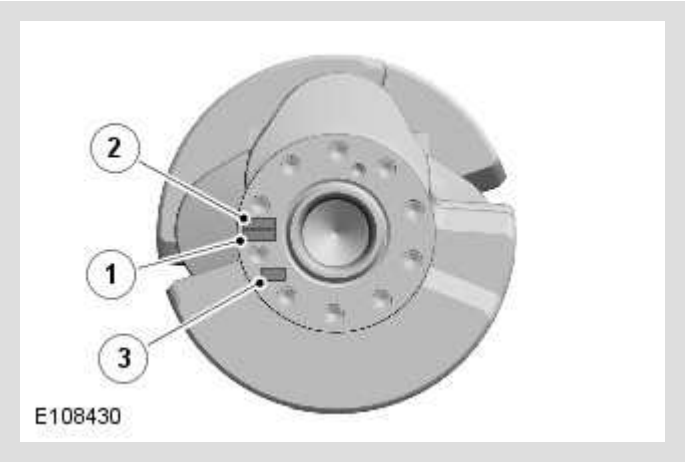
cardiagn.com

The crankshaft is manufactured from forged carbon steel C38 with induction hardened main and pin bearing journals. The fillets of the main journals are fillet rolled to improve strength. The fillets of the pins are induction hardened due to the split pin design, improving the strength of the crankshaft.

A six counterweight design has been used to balance the V6 split pin design ensuring less vibration.

An oil grove in the upper half of each main bearing transfers the oil into the crankshaft for lubrication of the connecting rod bearings.

CRANKSHAFT DATA LOCATION

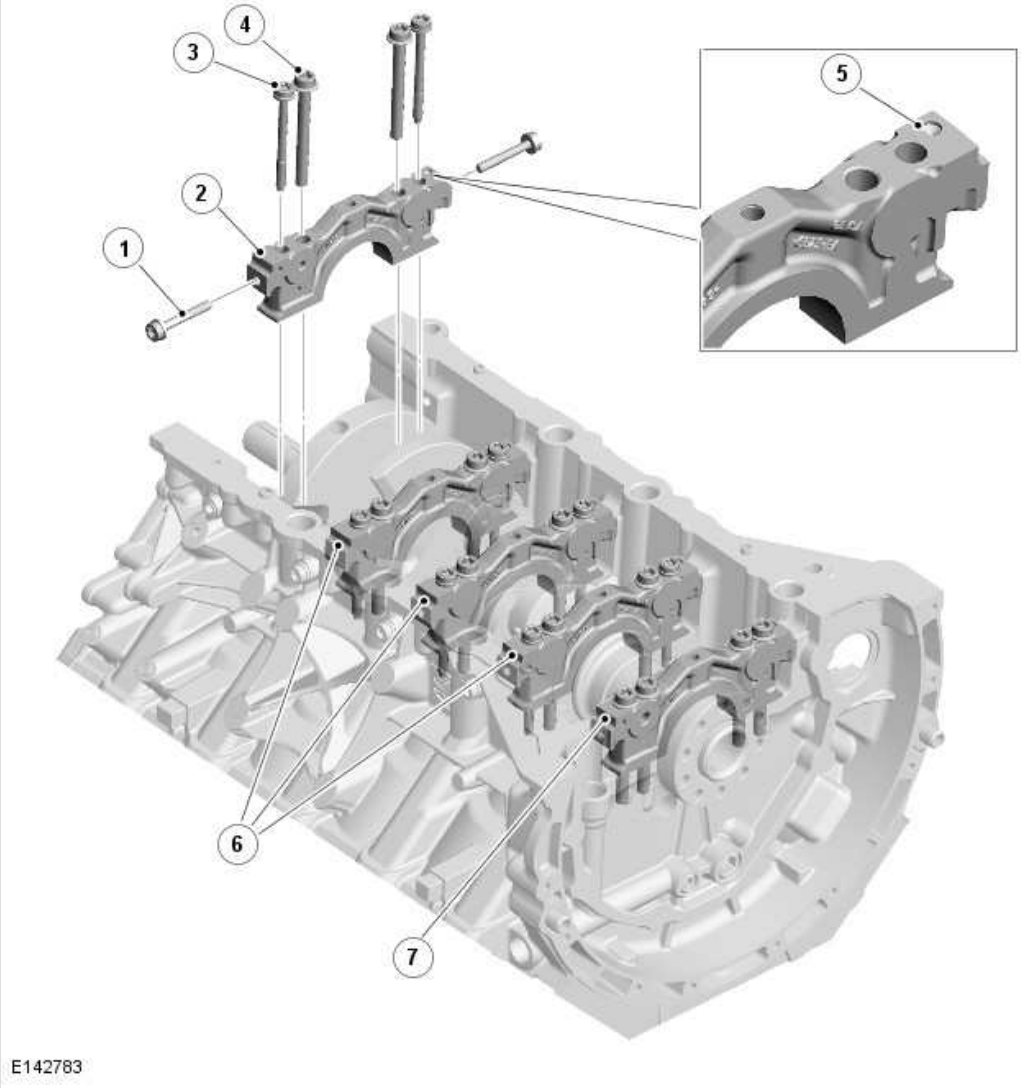


ITEM	DESCRIPTION
1	Pin journal classification and plant identification
2	Main journal classification
3	Date and time codes

The main bearings are numbered 1 to 5 starting from the front of the engine. There are six grades of main bearing available, each being color coded. Journal sizes are marked on the rear of the crankshaft. For additional information, refer to: Camshaft Bearing Journal Clearance (303-00 Engine System - General Information, General Procedures).

CRANKSHAFT INSTALLATION

cardiagn.com



ITEM	DESCRIPTION
1	Cross cap bolt (8 off - not fitted to rear main bearing cap)
2	Front main bearing cap
3	Outer main bearing cap bolt (10 off)
4	Inner main bearing cap bolt (10 off)
5	Identification mark - must face front of engine
6	Main bearing caps (3 off)
7	Rear main bearing cap

cardiagn.com

The main bearing caps are made from cast iron and are cross bolted to increase rigidity. An identification mark on each bearing cap must face the front of the engine.

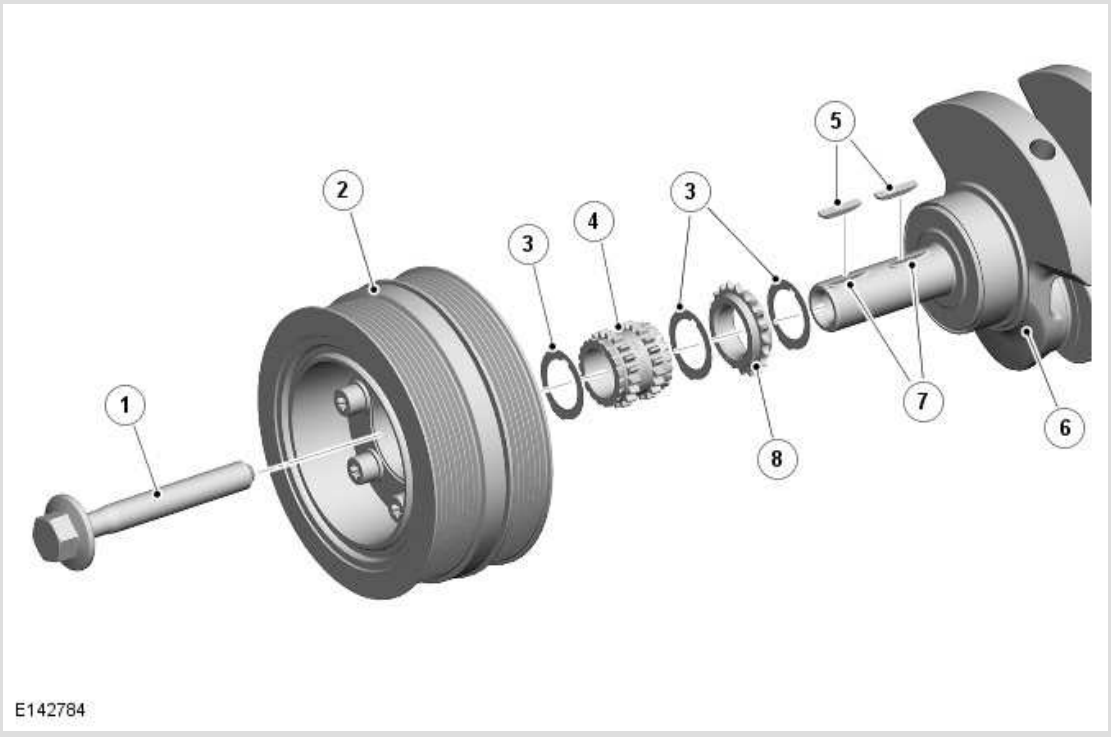
There are six grades of main bearing available, each being color coded. Journal sizes are marked on the rear of the crankshaft.

The thickness grade of all main bearing shells are to be selected to give a total running clearance of not less than 0.046mm or not greater than 0.067mm.

The main bearing shells in the cylinder block have a central hole and an internal groove to allow for main journal lubrication. The bearing shells in the main bearing caps are plain with no grooves.

Special tools are required to ensure the correct alignment of the upper and lower main bearing shells.

CRANKSHAFT PULLEY / VIBRATION DAMPER



ITEM	DESCRIPTION
1	Pulley bolt
2	Crankshaft pulley/vibration damper

cardiagn.com

3	Friction washer
4	Timing chain drive sprocket
5	Woodruff keys
6	Crankshaft
7	Woodruff key slots
8	Oil pump drive sprocket

At the front of the crankshaft, a tuned torsional vibration damper is incorporated into the crankshaft pulley.

The pulley is located on two woodruff keys which are located in slots in the crankshaft. The woodruff keys are a press fit in the slots and must be correctly aligned.

If the pulley is removed, a new friction washer must be located between the timing chain drive sprocket and the crankshaft pulley and a new pulley bolt must also be used.

The crankshaft pulley/vibration damper is not a serviceable component and must not be disassembled.

DRIVE PLATE

cardiagn.com

cardiagn.com

ITEM	DESCRIPTION
1	Bolt (10 off)
2	Drive plate
3	Dowel
4	Crankshaft
5	Reluctor ring
6	Starter motor
7	Crankshaft Position (CKP) sensor

The drive plate is located at the rear of the crankshaft. The drive plate has three functions; to transfer drive from the crankshaft to the transmission, to transfer drive from the starter motor to the crankshaft and to provide the engine management system with crankshaft speed and position via a reluctor ring and a sensor.

The drive plate is secured to the crankshaft flange with 10 bolts and is located with a dowel to ensure the correct timing of the reluctor ring to the crankshaft orientation.

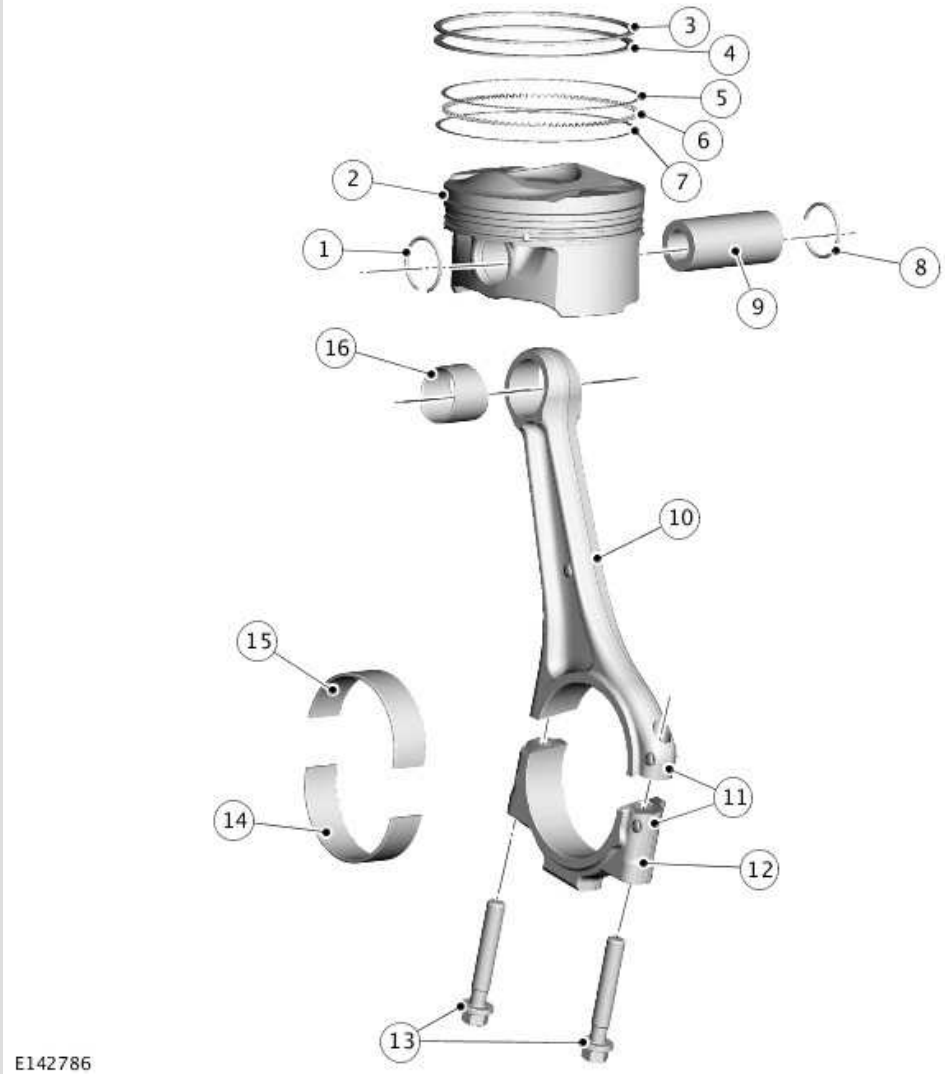
The drive plate is a pressed and cast steel fabrication, which comprises a cast steel starter ring gear and a pressed steel drive plate and reluctor ring. The two components are riveted together as one assembly.

Four holes in the drive plate provide for the attachment of the transmission torque converter to transfer drive from the crankshaft to the transmission.

The reluctor ring has 60 teeth with 2 teeth missing to provide a gap. A Crankshaft Position (CKP) sensor is located in the oil pan casting and measures speed and position as the reluctor ring rotates.
For additional information, refer to: Electronic Engine Controls (303-14A Electronic Engine Controls - V6 S/C 3.0L Petrol, Description and Operation).

PISTONS AND CONNECTING RODS

cardiagn.com



ITEM	DESCRIPTION
1	Circlip
2	Piston
3	Upper compression ring
4	Lower compression ring
5	Oil control ring
6	Separator
7	Oil control ring
8	Circlip
9	Gudgeon pin
10	Connecting rod

cardiagn.com

11	Alignment marks
12	Connecting rod cap
13	Bolts
14	Lower large end shell bearing
15	Upper large end shell bearing
16	Small end bearing

The diameter of each piston is graded and precisely matched to each cylinder bore to help reduce noise. In the vertical plane, the pistons have a slight barrel form, which helps to ensure a reliable oil film is maintained between the piston and the cylinder bore. A solid film lubricant coating is applied to both reaction faces of the piston to reduce wear and improve fuel economy.

A three-ring piston-sealing system is used. The steel top ring is treated with a Physical Vapor Deposition (PVD) peripheral coating. PVD is a coating technique where material can be deposited with improved properties to ensure good cylinder bore compatibility and wear resistance. A Napier center ring helps cylinder pressure and oil management, while the three-piece oil control lower ring is produced from nitrided steel. The two upper rings are marked with an 'R' which must face upwards, towards the top of the piston.

The pistons are cooled with engine oil from three piston cooling jets installed under the valley of the cylinder block.

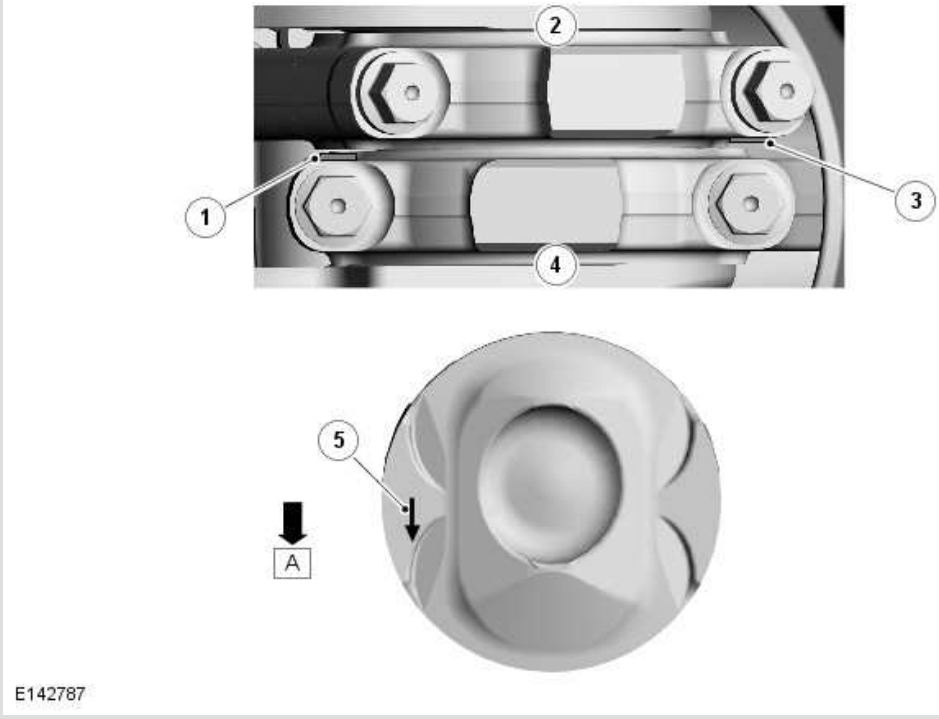
The connecting rods are forged from high strength steel. The connecting rod cap is fracture-split from the rod to ensure precision re-assembly for shell bearing alignment. There are three grades of large end bearing available, each being color coded.
For additional information, refer to: Connecting Rod Cleaning (303-00 Engine System - General Information, General Procedures).

The correct alignment of the cap with the connecting rod is indicated by marks on adjacent faces of the two components.

cardiagn.com

The pistons are attached to the connecting rods with a gudgeon pin, which is secured with 2 circlips. The gudgeon pin is located through the small end bearing in the connecting rod which allows the piston to articulate with the linear movement of the connecting rod. The circlips locate in grooves in the piston.

CONNECTING ROD AND PISTON ORIENTATION



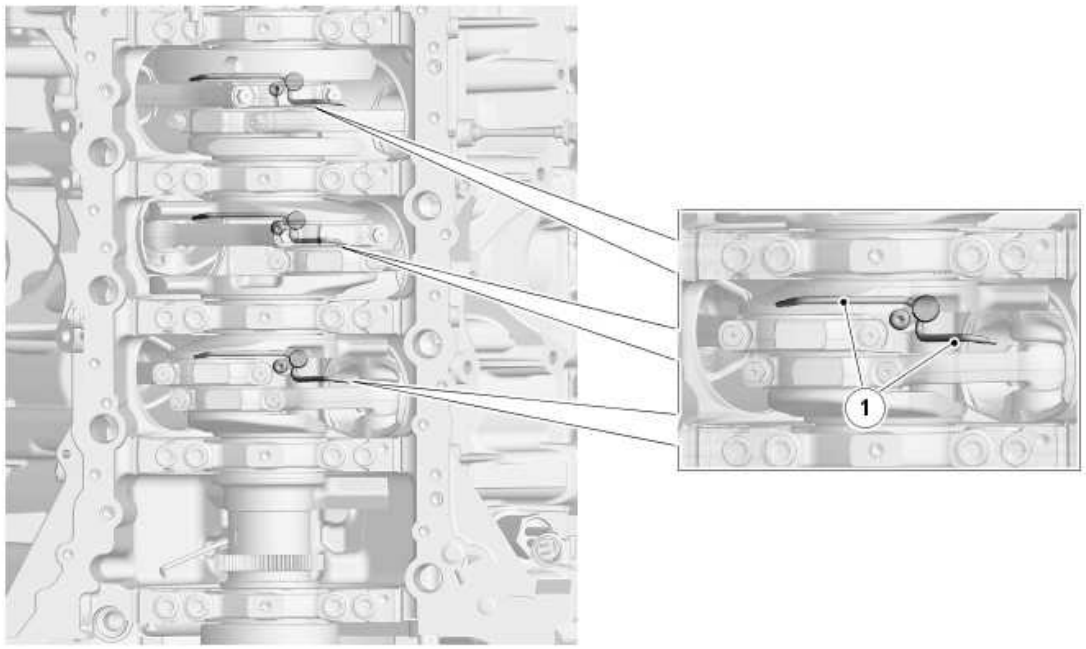
ITEM	DESCRIPTION
A	Front of engine
1	Alignment mark
2	Left side (bank 2)
3	Alignment mark
4	Right side (bank 1)
5	Piston orientation arrow

The orientation of the connecting rods and pistons on the crankshaft are given below:

cardiagn.com

- Bank 1 - The arrow on the piston crown must face the front of the engine and the cap and connecting rod alignment marks must face the rear of the engine.
- Bank 2 - The arrow on the piston crown must face the front of the engine and the cap and connecting rod alignment marks must face the front of the engine.

PISTON COOLING JETS



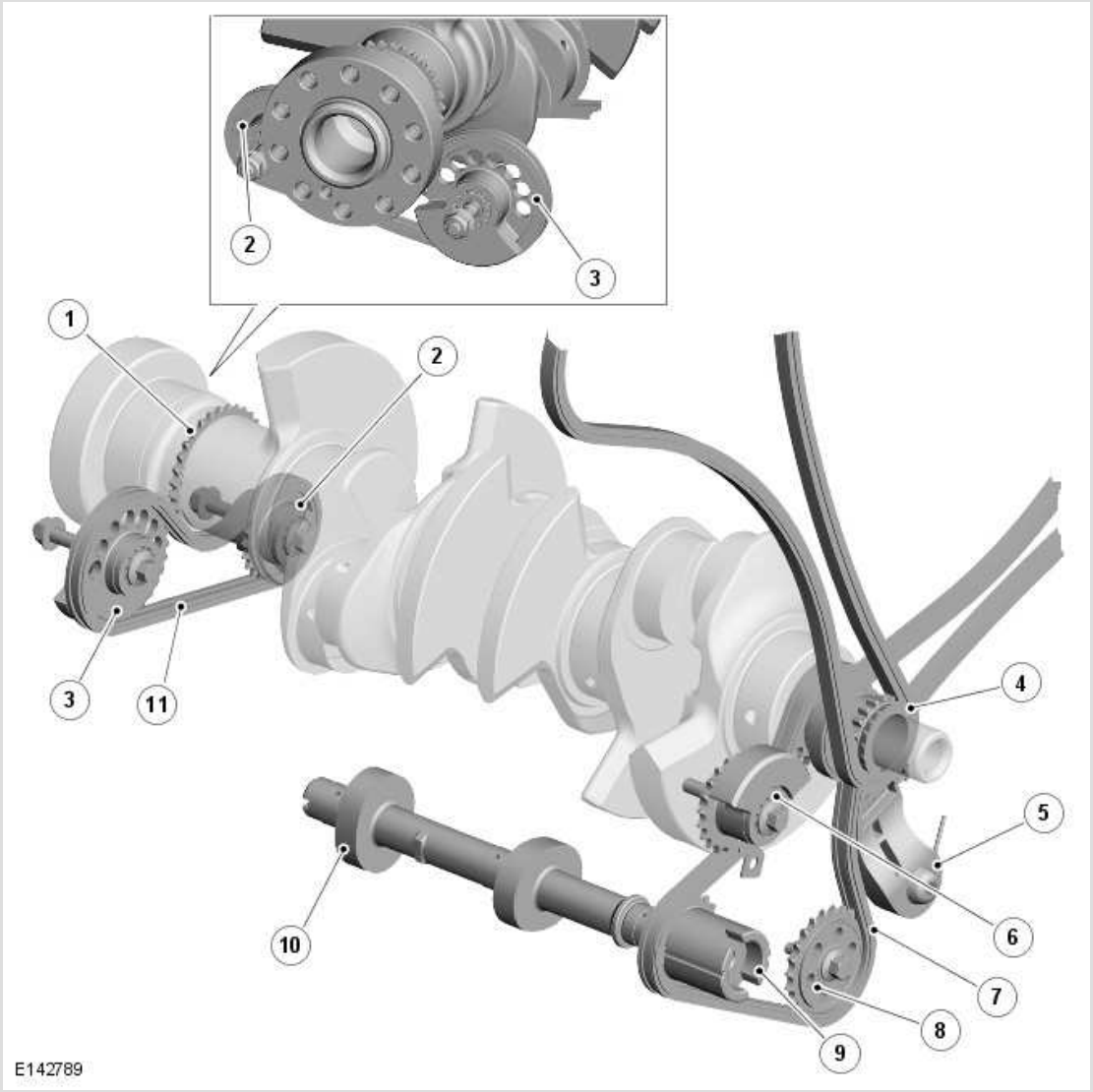
ITEM	DESCRIPTION
1	Piston cooling jets

Piston cooling jets, located in the cylinder block, provide piston and piston pin cooling and lubrication. Each piston cooling jet has two outlet nozzles which spray oil onto the underside of the two adjacent pistons, one from each cylinder bank. Each jet is located in a threaded hole between the pair of cylinders and is secured with a bolt. The jets are supplied pressurized engine oil from the oil pump via a drilling in the cylinder block.

cardiagn.com

Each jet sprays oil onto the inside of the piston. The oil coats the underside of the piston to help cool each piston crown. Additionally, oil lubricates the small end bearing and gudgeon pin.

DYNAMIC BALANCERS AND AUXILIARY CAMSHAFT



ITEM	DESCRIPTION
1	Crankshaft rear dynamic balancer drive sprocket
2	Idler sprocket
3	Rear dynamic balancer
4	Crankshaft timing chain sprocket
5	Auxiliary drive tensioner
6	Front dynamic balancer
7	Auxiliary drive chain

cardiagn.com

8	Oil pump sprocket
9	Auxiliary shaft sprocket
10	Auxiliary shaft
11	Drive chain

Dynamic engine balancing is performed by two weighted dynamic balancers, located at the front and rear of the cylinder block. The dynamic balancers oppose and cancel out vibrations created by the engine's rotating components.

The front and rear dynamic balancers comprise a sprocket with an offset weight.

Both dynamic balancers are fitted with two needle roller bearings. A threaded shaft passes through the needle roller bearings and bolts through the rear main bearing cap for the rear dynamic balancer and idler. A threaded shaft passes through the needle roller bearings and screws into a threaded hole in the front main bearing cap for the front dynamic balancer. A shoulder on the shaft maintains the correct lateral position of the dynamic balance. Thrust bearings on either side of the dynamic balancer control lateral movement.

The rear dynamic balancer is driven by a dedicated drive chain which is driven by a sprocket which is integral with the crankshaft. An non-weighted idler sprocket, supported on needle roller bearings, is fitted in the same way on the opposite side of the crankshaft main bearing cap. The drive chain connects the two sprockets and the drive gear on the crankshaft.

The front dynamic balancer is driven by the auxiliary drive chain, which also drives the auxiliary camshaft used to operate the two high pressure fuel pumps. The auxiliary drive chain is driven off the crankshaft sprocket, and also provides drive the auxiliary camshaft sprocket and the oil pump sprocket.

cardiagn.com

The dynamic balancers rotate at crankshaft speed in opposite directions. The equally sized weights are phased so that the inertia reaction to their counter-rotation cancels out vibration caused by the engine in both horizontal and vertical planes.

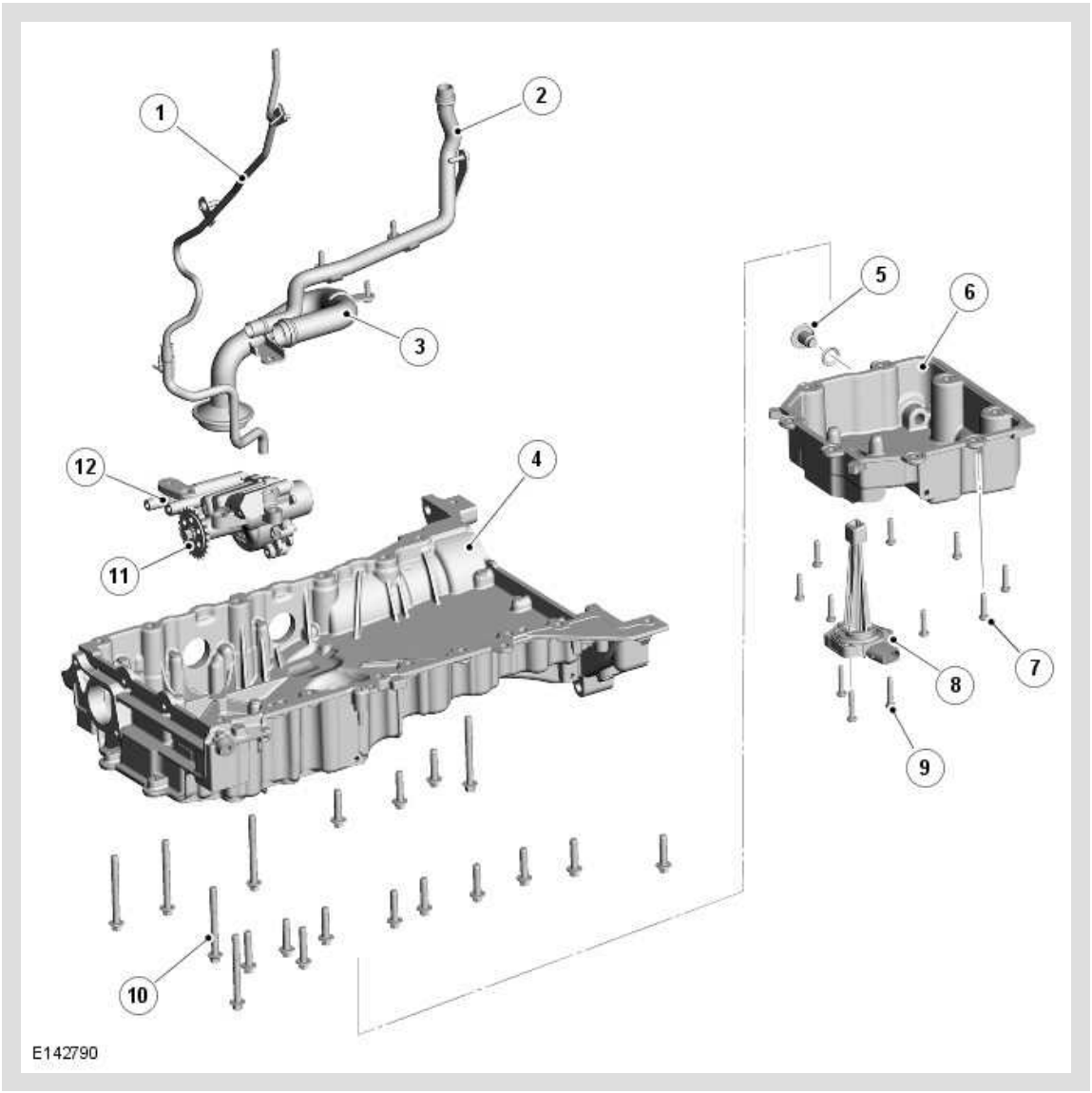
Both dynamic balancers must be timed to the crankshaft position by their position on the drive chain. Refer Engine - V6 3.0L SC Petrol - Removal and Installation for procedure.

The auxiliary camshaft is located on two machined bosses on the windage tray and secured with a camshaft carrier which is secured to windage tray with four bolts. The auxiliary camshaft has two cam lobes, with each lobe operating a high pressure fuel pump, via a tappet. The camshaft is fitted with a drive sprocket which is a press fit on the camshaft. The sprocket is timed to the cam lobes to match the pump delivery strokes with crankshaft position and therefore must not be removed.

The auxiliary camshaft is driven at crankshaft speed by the auxiliary drive chain, which also drives the oil pump and the front dynamic balancer from the crankshaft sprocket. The two lobes on the camshaft act, through tappets located in the camshaft carrier, against a plunger on each single cylinder high pressure pump.
For additional information, refer to: Fuel Charging and Controls (303-04A Fuel Charging and Controls - V6 S/C 3.0L Petrol, Description and Operation).

OIL PAN

cardiagn.com



ITEM	DESCRIPTION
1	Oil evacuation tube
2	Oil pump outlet pipe to cylinder block
3	Oil pump pick-up pipe

cardiagn.com

4	Oil pan body
5	Drain plug
6	Oil pan
7	Oil pan retaining screws (8 off)
8	Oil level and temperature sensor
9	Bolts (3 off)
10	Oil pan body retaining bolts (16 off)
11	Oil pump sprocket
12	Oil pump

The oil pan is a two-piece assembly comprising an oil pan body and an oil pan.

The oil pan body is located on the underside of the cylinder block. It is sealed to the cylinder block with a 3 mm bead of RTV sealant and is secured with 16 bolts.

The oil pan body covers the windage tray and the oil pump and also collects engine oil returning from the cylinder heads and crankshaft lubrication.

Located towards the front of the oil pan body is the oil pan. It is sealed to the oil pan body with a 3 mm bead of RTV sealant and secured with 8 screws.

A drain plug and seal are located on the right side of the oil pan. The oil level and temperature sensor is located in the bottom of the oil pan and is sealed with a rubber gasket and secured with 3 screws.

The oil pan remains full of engine oil and provides the location for the oil pump pick-up pipe and filter. The smaller size of the oil pan ensures that engine oil is always available at the oil pump pick-up and prevents oil starvation due to vehicle inclination and oil surge due to cornering, braking and acceleration.

cardiagn.com

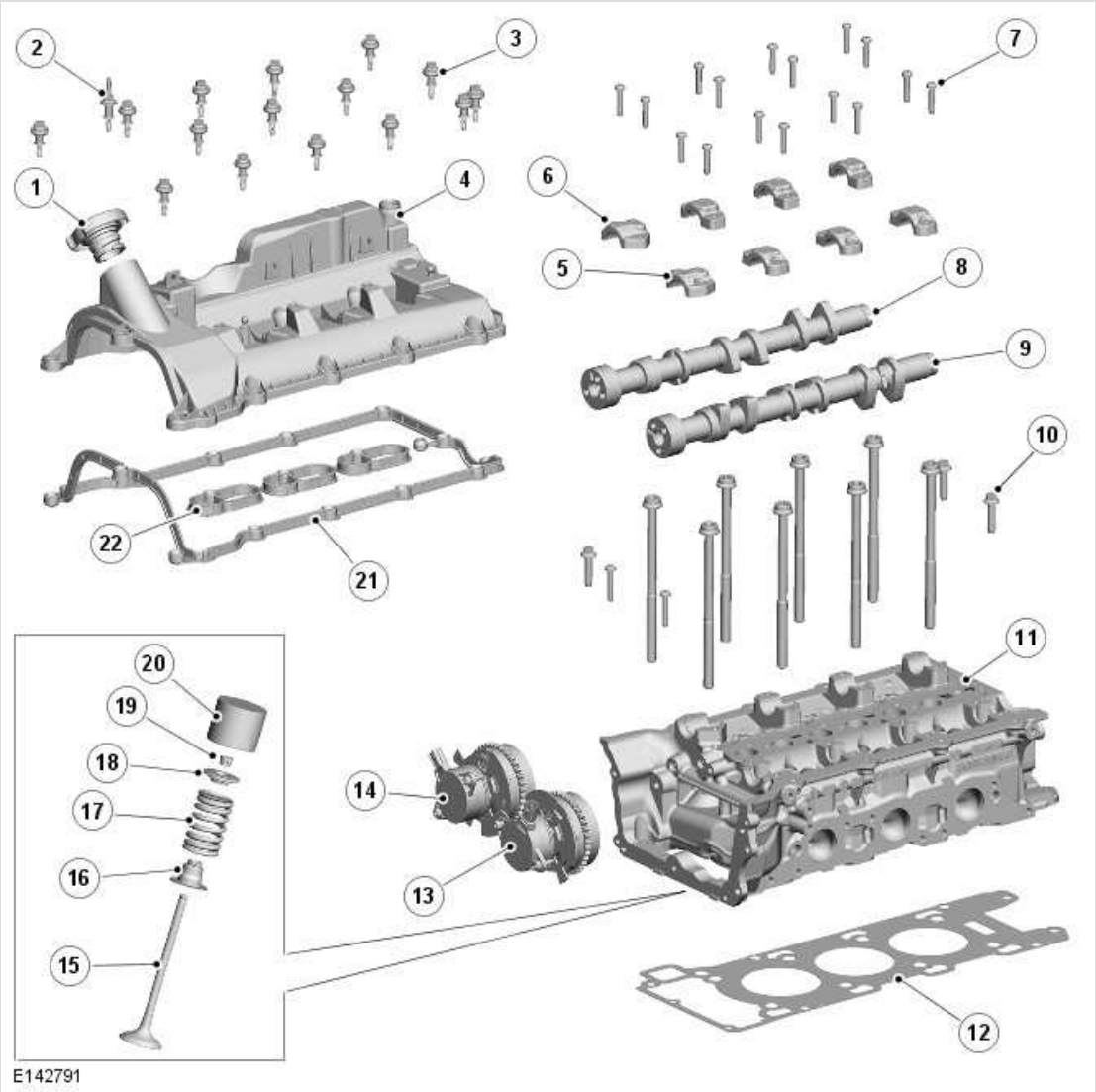
An oil evacuation tube is installed to allow oil to be drawn from the sump pan. The upper end of the oil evacuation tube is located under the oil filler cap in the camshaft cover.

CYLINDER HEADS - DESCRIPTION

CYLINDER HEAD COMPONENTS

NOTE:

Left (Bank 2) cylinder head shown, right (Bank 1) cylinder head similar



cardiagn.com

ITEM	DESCRIPTION
1	Oil filler cap assembly
2	Stud, nut, grommet and sleeve
3	Bolt, grommet and sleeve (15 off)
4	Camshaft cover
5	Exhaust camshaft caps (4 off)
6	Inlet camshaft caps (4 off)
7	Camshaft cap bolts (16 off)
8	Inlet camshaft
9	Exhaust camshaft
10	Cylinder head bolts (13 off)
11	Cylinder head
12	Cylinder head gasket
13	Variable Camshaft Timing (VCT) actuator (exhaust)
14	VCT actuator assembly (inlet)
15	Valve (12 off (6 inlet, 6 outlet)
16	Valve spring seat and stem seal (12 off)
17	Valve spring (12 off)
18	Valve spring retainer (12 off)
19	Valve spring collet (12 off)
20	Valve tappet (12 off)
21	Camshaft cover gasket
22	Camshaft cover spark plug/injector gasket (3 off)

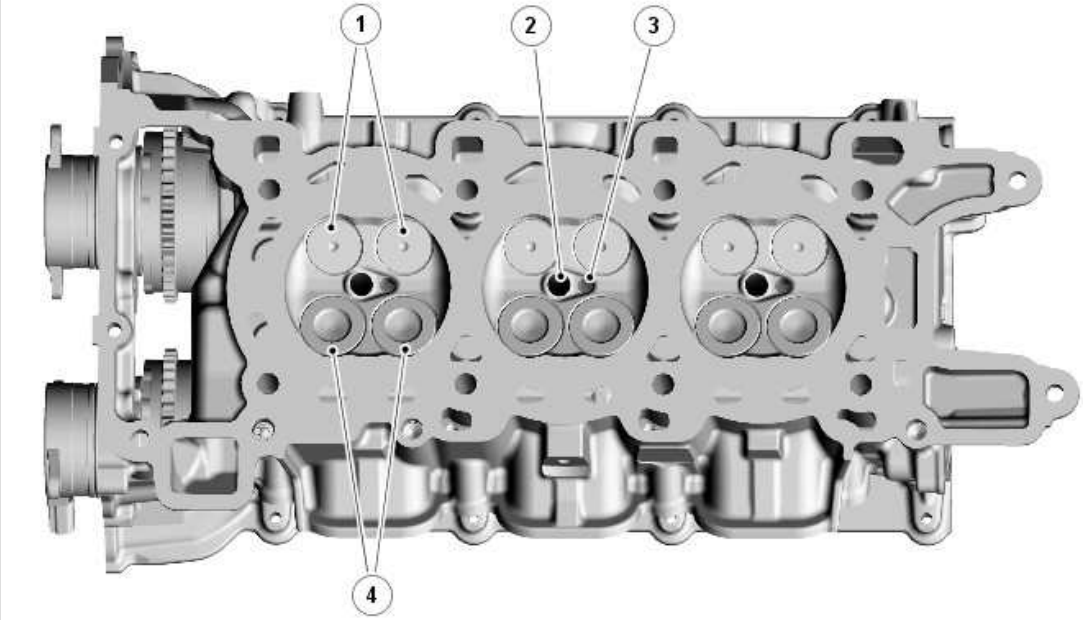
CYLINDER HEADS

The cylinder heads are manufactured in gravity die cast aluminum alloy and are unique for each cylinder bank. Deep-seated bolts reduce distortion and secure the cylinder heads to the cylinder block.

cardiagn.com

Each cylinder is served by four valves. To help achieve the required gas-flow characteristics, these are arranged asymmetrically around the cylinder bore. Each cylinder has a centrally mounted fuel injector and spark plug.

The valves are a conventional arrangement, with a valve and spring assembly retained by a valve collet. The valve tappets are graded and selected on assembly to obtain the correct valve clearance dimensions.



ITEM	DESCRIPTION
1	Exhaust valves
2	Fuel injector location
3	Spark plug location
4	Inlet valves

The cylinder head gasket is of a multi-layer steel construction.

The threads for the spark plugs are machined at a precise start point to ensure that each spark plug is orientated in the cylinder correctly.

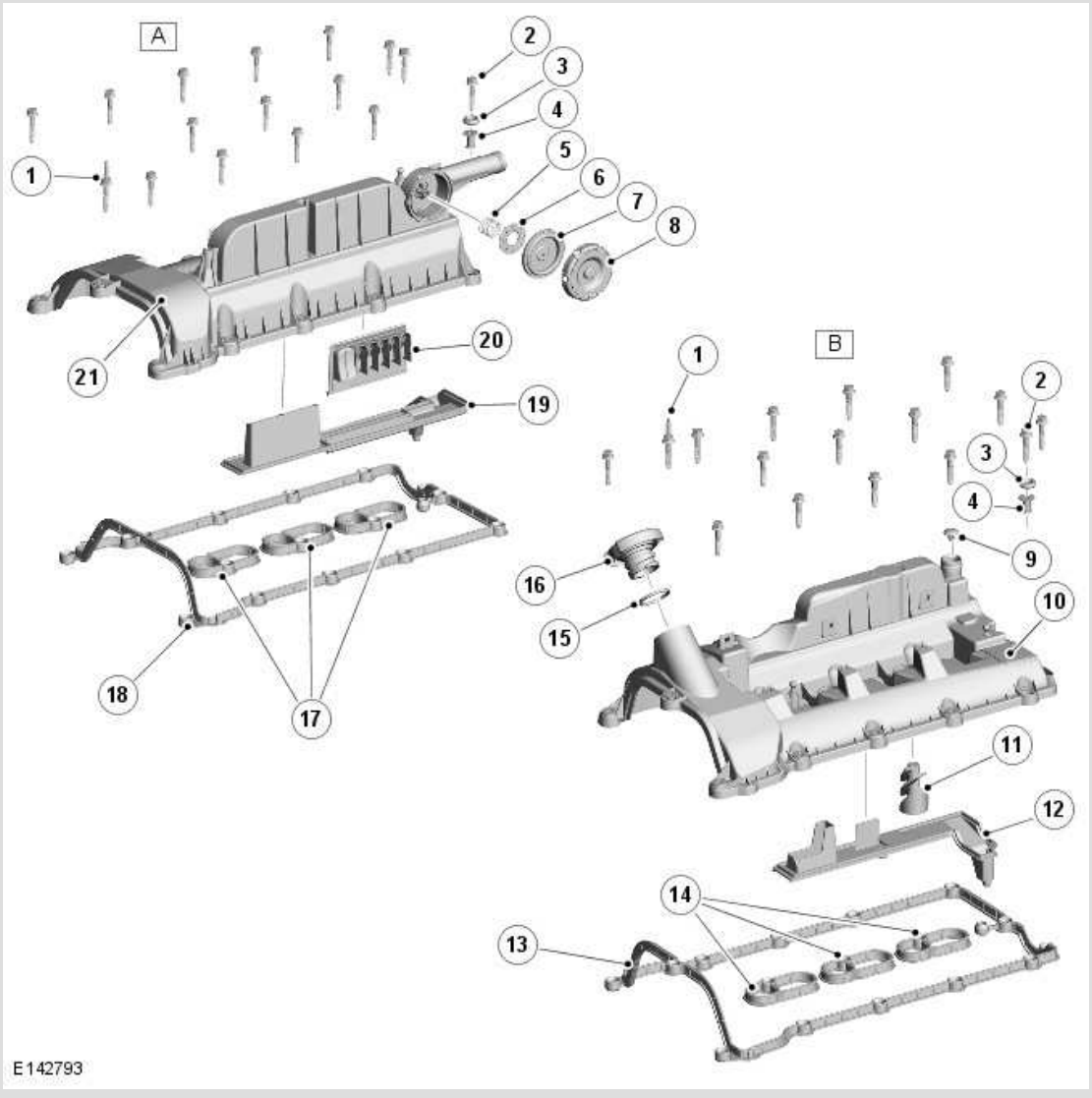
cardiagn.com

The benefits of this are optimum spark plug intrusion into the combustion chamber to improve combustion, idle stability, dilution tolerance and spark plug durability. The spark plug must be tightened to the specified torque to ensure the correct orientation.

The camshafts run on line bored journals in the cylinder head and camshaft caps. Therefore it is very important that the camshaft caps are maintained with their respective journal and the orientation is as marked on the cap.

A camshaft cover is fitted and sealed with a rubber seal and 3 smaller rubber seals. The cover is retained in position with 15 bolts which are located through a sleeve and a grommet for sealing and a single stud and nut.

CAMSHAFT COVERS



cardiagn.com

ITEM	DESCRIPTION
A	Right Side Bank 1
B	Left Side Bank 2
1	Stud, nut, grommet and sleeve (1 off Bank 2, 2 off Bank 1)
2	Bolt (15 off Bank 2, 14 off Bank 1)
3	Grommet (15 off per cover)
4	Spacer (15 off per cover)
5	Pressure control valve spring
6	Pressure control valve inlet
7	Twin pressure control valve
8	Pressure control valve cover
9	Two-way valve
10	Camshaft cover - bank 2
11	Spiral oil separator
12	Baffle plate
13	Camshaft cover gasket
14	Camshaft cover spark plug/injector gasket (3 off)
15	O ring seal
16	Oil filler cap assembly
17	Camshaft cover spark plug/injector gasket (3 off)
18	Camshaft cover gasket
19	Baffle plate
20	Omega flap plate
21	Camshaft cover - bank 1

Each camshaft cover is secured to the cylinder head with 15 bolts and 1 stud and nut. A grommet seals the holes in the cover and a sleeve controls the compression of the grommet.

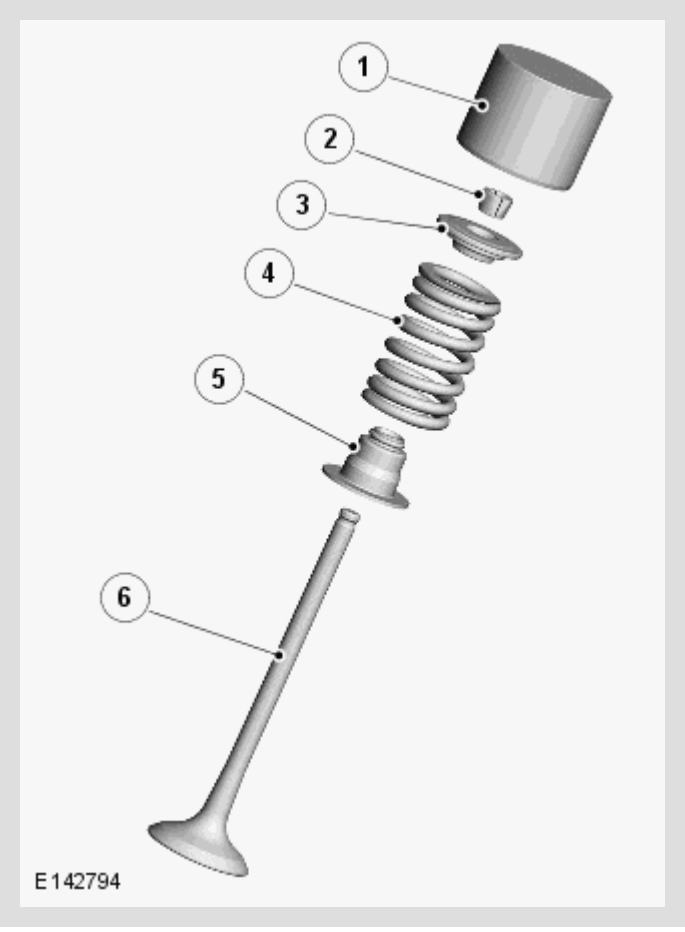
cardiagn.com

Threaded inserts are fitted to each cover to allow for the attachment of the ignition coils. A plastic cover is fitted over the ignition coils and is secured with snaplock studs.

Each camshaft cover is fitted with a breather. The left side cover has a baffle plate which collects oil vapor and allows it drain back into the oil pan via the cylinder block. The left side breather provides for engine full load operation and vents cylinder block emissions into the left side air filter outlet. The right side cover is fitted with an omega plate and a pressure control valve. The right side breather provides for engine part load operation and vents cylinder block emissions into the throttle which is integral with the supercharger.

A groove in the outer edge of each cover provides the location for the re-useable camshaft cover gasket. Three separate gaskets, located in the center of the camshaft cover, prevent oil leaking into the area around the fuel injectors, spark plugs and coils.

VALVES AND TAPPETS



cardiagn.com

ITEM	DESCRIPTION
1	Valve tappet
2	Valve spring collet
3	Valve spring seat
4	Valve spring
5	Valve stem seal
6	Valve

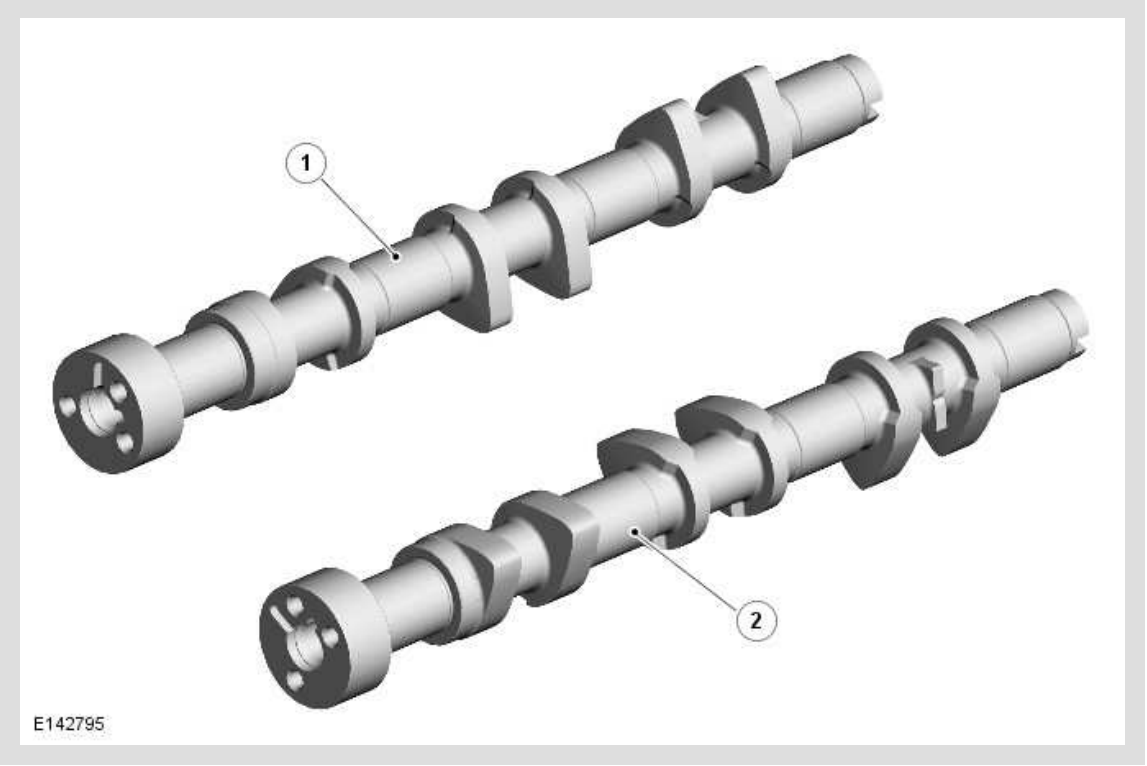
The engine uses 24 stainless steel valves; 12 inlet and 12 exhaust. The inlet valves are 33.0 mm diameter and the exhaust valves are 28.0 mm diameter. The large valve size allows for large cylinder head port sizes which assist which with engine performance and improved emissions. The valve stems are 5.4 mm diameter which allows for reduced flow interruption through the inlet and exhaust ports assisting with performance and improved emissions.

The valves are located in conventional, non-serviceable valve guides in the cylinder head. A valve stem seal with integral valve seat is located in the cylinder head. The valve spring is retained in a compressed states on the valve stem by a valve spring seat and a pair of valve spring collects.

The valves are opened mechanically by a bucket design valve tappet which is operated directly by the associated camshaft lobe. The valve clearance is set by selection of the appropriate valve tappet to achieve the required valve clearance.

CAMSHAFTS

cardiagn.com



ITEM	DESCRIPTION
1	Inlet camshaft
2	Exhaust camshaft

Each cylinder head is fitted with 2 camshafts; inlet and exhaust. The lobes on the camshafts act on the valve tappets to open and close the valves.

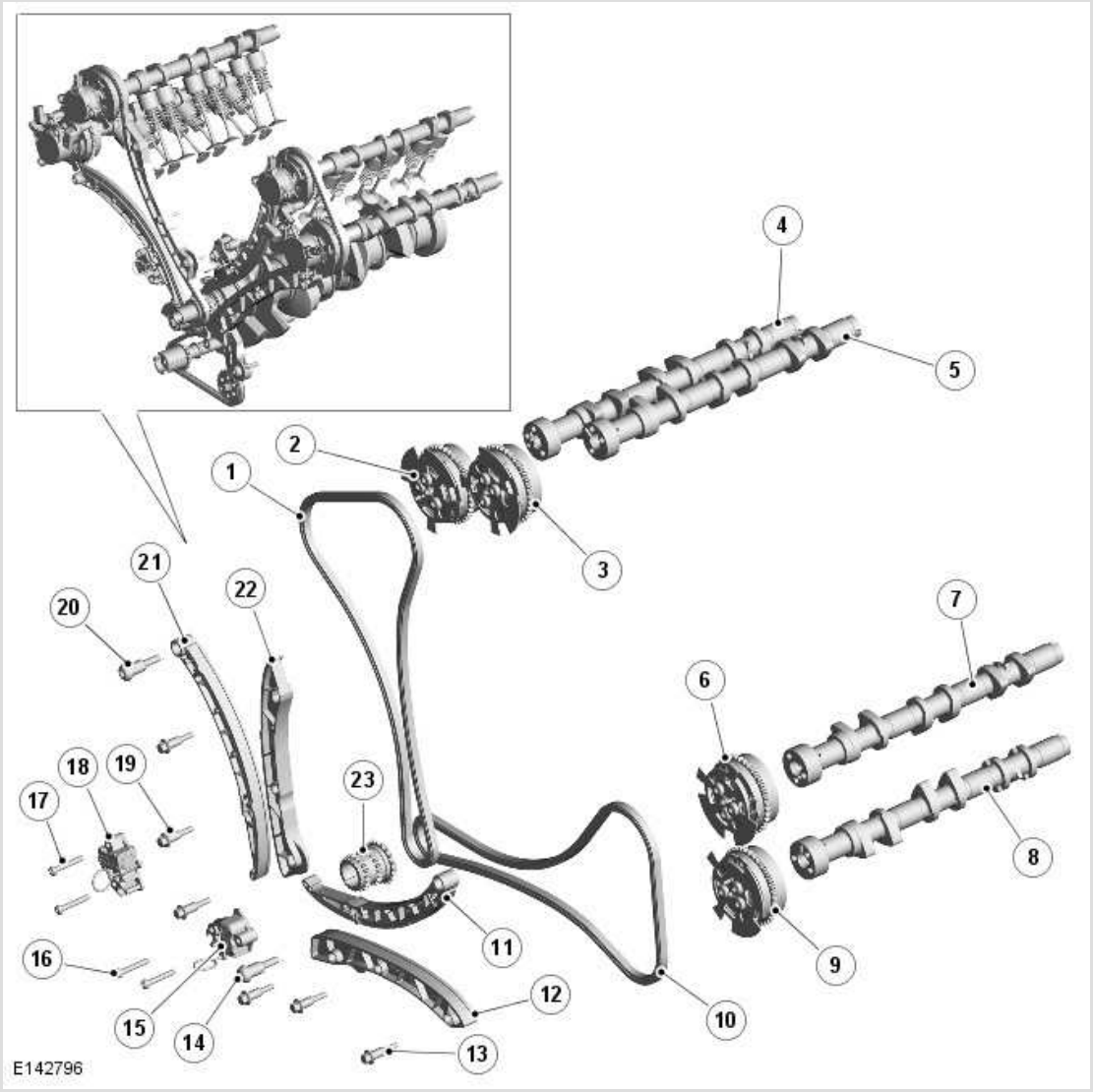
The camshafts run on machined bearing journals in the cylinder heads and camshaft caps. The camshaft caps are marked with 'IN' and 'EX' to denote inlet and exhaust. The caps at the front of the engine are marked 'AB'. Before removal, each camshaft cap must be

cardiagn.com

marked with its position to ensure correct re-assembly. Each camshaft cap is secured with 2 M6 screws.

Each camshaft is fitted with a VCT actuator. Each actuator contains a sprocket which drives the camshaft via a timing chain driven from the crankshaft. The VCT actuator can change the timing of the camshaft, increasing engine efficiency and performance.

CAMSHAFT TIMING CHAIN



ITEM	DESCRIPTION
1	Timing chain - Right bank 1
2	Exhaust Variable Camshaft Timing (VCT) actuator
3	Inlet VCT actuator
4	Inlet camshaft

cardiagn.com

5	Exhaust camshaft
6	Inlet VCT actuator
7	Inlet camshaft
8	Exhaust camshaft
9	Exhaust VCT actuator
10	Timing chain - left bank 2
11	Tensioner arm - left
12	Timing chain guide - left
13	Shoulder bolt (3 off)
14	Shoulder pivot bolt
15	Timing chain tensioner assembly - left
16	Screw (2 off)
17	Screw (2 off)
18	Timing chain tensioner assembly - right
19	Shoulder bolt (3 off)
20	Shoulder pivot bolt
21	Tensioner arm - right
22	Timing chain guide - right
23	Crankshaft sprocket

Two, endless, simplex roller timing chains are used to drive the camshafts; one chain for each cylinder bank. The timing chains are driven from a crankshaft sprocket and are passed over two sprockets which are integral with the VCT actuators.

A procedure is required to ensure that the correct crankshaft to camshaft timing is achieved. Refer Engine - V6 3.0L SC Petrol - Removal and Installation for procedure.

Each timing chain has a fixed timing chain guide which is secured to the cylinder block with three shoulder bolts. A tensioner arm is fitted

cardiagn.com

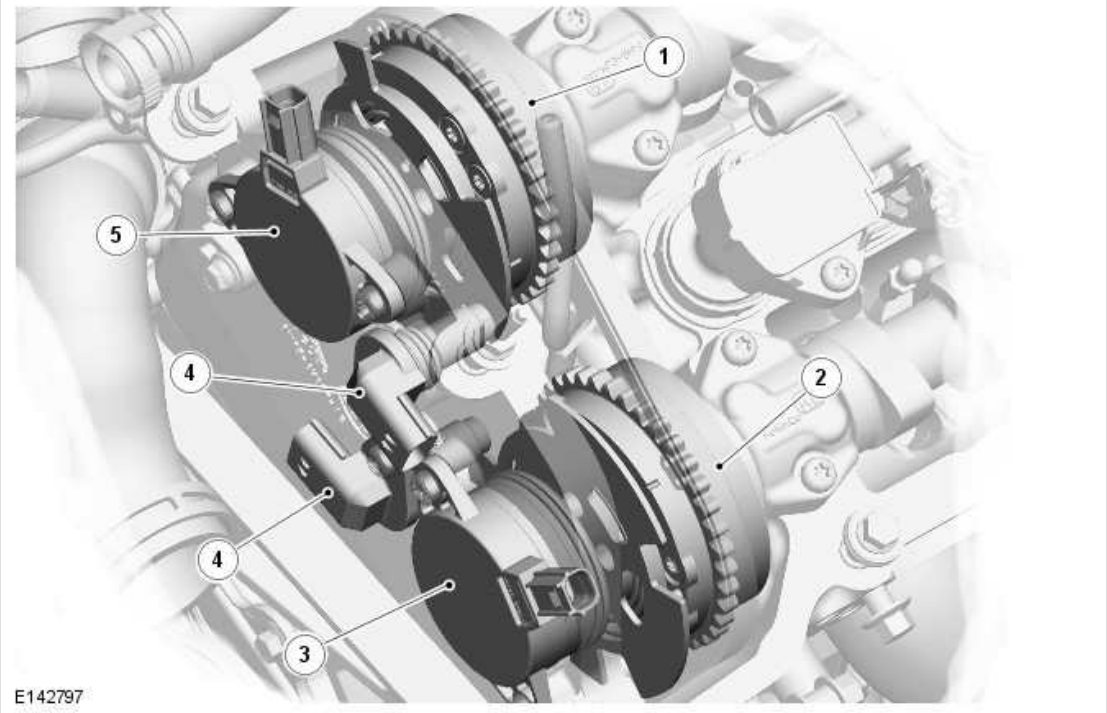
to each timing chain which can rotate around a shoulder pivot bolt. Each timing chain has a mechanical tensioner operated by spring tension to apply a controlled tension to the timing chain. This maintains the timing chain at the correct tension and allows for and dampens backlash in the chain tension due to engine deceleration. The timing chains and tensioners are maintenance free components.

Each timing chain tensioner has a hole which allow for the locking of the tensioner to facilitate removal of the tensioner arm, guide or camshaft timing chain. The tensioner plunger can be pushed back into the housing and a pin inserted to lock the tensioner in the retracted position.

The timing chains are lubricated with engine oil from jets located at the front of the engine block.

VARIABLE CAMSHAFT TIMING (VCT)

VARIABLE CAMSHAFT TIMING



ITEM	DESCRIPTION

cardiagn.com

1	Inlet camshaft VCT actuator
2	Exhaust camshaft VCT actuator
3	Exhaust VCT solenoid
4	Camshaft Position (CMP) sensors
5	Inlet VCT solenoid

The timing of the inlet and exhaust camshafts can be adjusted independently by an electro-hydraulic controlled VCT system. The ECM controls the system using information from the CMP sensors and the CKP (crankshaft position) sensor.

The VCT system varies the timing of the intake and exhaust camshafts to deliver optimum engine power, efficiency and emissions. The timing of the intake camshafts has a range of 62 degrees of crankshaft angle. The timing of the exhaust camshafts has a range of 50 degrees of crankshaft angle.

In the base timing position:

- The intake camshafts are fully retarded.
- The exhaust camshafts are fully advanced.

CAMSHAFT	VALVE OPENS	VALVE CLOSES
Intake	33 degrees BTDC (before top dead center) to 29 degrees ATDC (after top dead center)	197 to 259 degrees ATDC
Exhaust	236 to 186 degrees BTDC	6 to 56 degrees ATDC

The system consists of a VCT unit and a VCT solenoid for each camshaft. The ECM controls the system using PWM (pulse width modulation) signals to the VCT solenoids.

The torsional energy generated by the valve springs and the inertia of the valve train components are used to operate the system.

Variable Camshaft Timing Units

cardiagn.com

The VCT units change the position of the camshafts in relation to the timing chains.

ITEM	DESCRIPTION
1	Bolt (3 off)
2	VCT unit
3	Filter
4	Camshaft
5	Inner plate
6	Housing and sprocket
7	Rotor assembly
8	Reed plate

cardiagn.com

9	Spring and lock pin
10	Spring (3 off)
11	Tip seal (3 off)
12	Spring (2 off)
13	Tip seal (2 off)
14	Spring
15	Dowel pin
16	Bias spring
17	Snap ring
18	Sensor wheel
19	Center plate
20	Snap ring
21	Screw (6 off)
22	Spool valve
23	Outer plate

Each VCT unit is attached to the camshaft by three bolts. A rotor assembly and a reed plate are installed inside a sprocket housing, which consists of a sprocket, an outer plate and an inner plate held together by six screws.

A sensor wheel, for the CMP sensor, a center plate and a bias spring are installed at the front of the VCT unit. The ends of the bias spring locate on the center plate assembly and the sprocket housing, to give a turning moment to the camshaft in the advance direction. A snap ring locates the sensor wheel on to a sleeve installed in the center of the rotor assembly. The opposite end of the sleeve locates in a bore in the front face of the camshaft, which contains a filter.

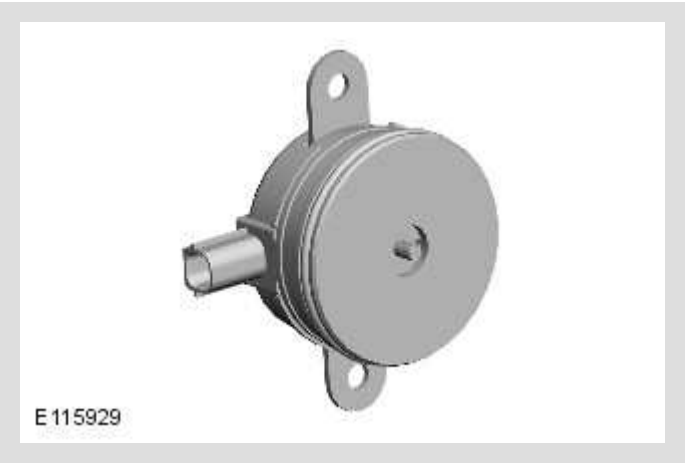
A spring and spool valve are installed in the rotor assembly sleeve and retained by a snap ring. The spring keeps the spool valve in contact with the armature of the related VCT solenoid.

cardiagn.com

Each VCT unit is supplied with engine oil from an oil gallery in the cylinder head, through the camshaft front bearing cap and a bore in the center of the camshaft.

Variable Camshaft Timing Solenoids

The VCT solenoids control the position of the spool valves in the VCT units.



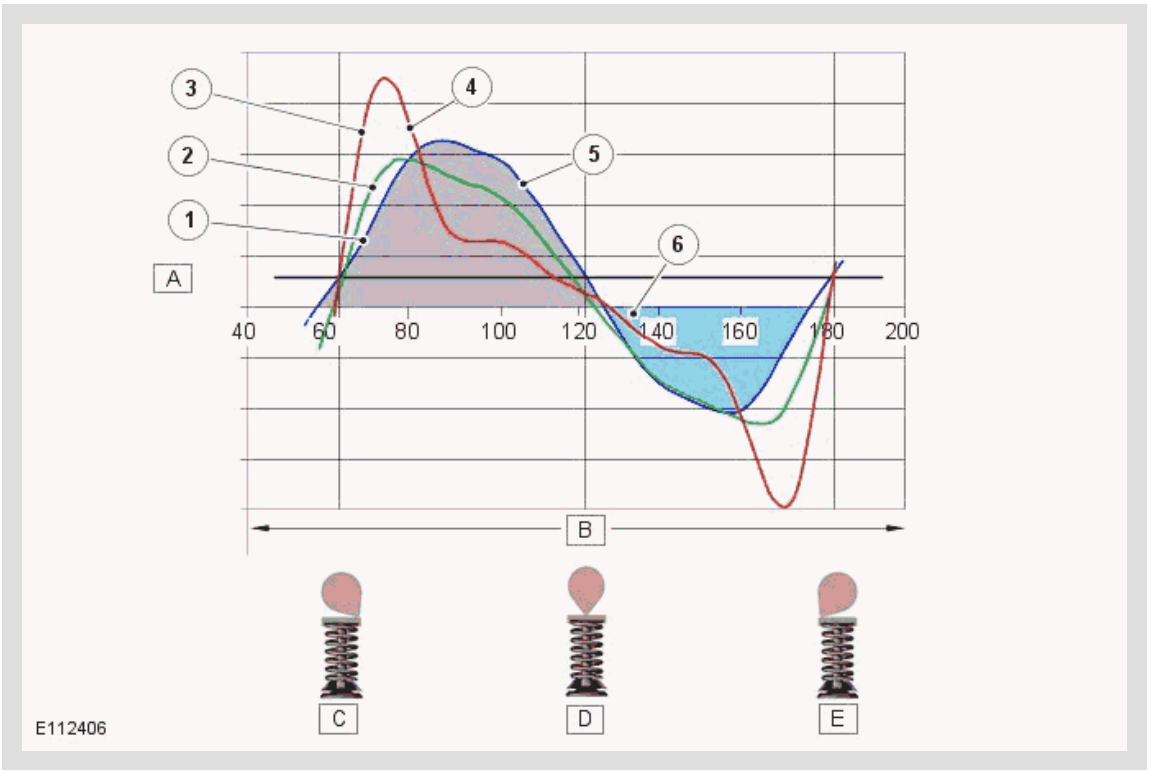
The VCT solenoids are installed in the front upper timing covers, immediately in front of their related VCT units. Each VCT solenoid is secured with two screws and sealed with an O-ring. A two pin electrical connector provides the interface with the engine harness.

Each VCT solenoid incorporates a spindle that acts on the spool valve in the related VCT unit to advance and retard the camshaft timing. The VCT solenoids operate independently and are controlled by a PWM signal from the ECM.

Variable Camshaft Timing Operation

When the engine is running, the compression and expansion of the valve springs causes momentary increases and decreases in the torque acting on the camshafts. These momentary changes of torque are sensed in the VCT units and used to change the camshaft timing.

cardiagn.com



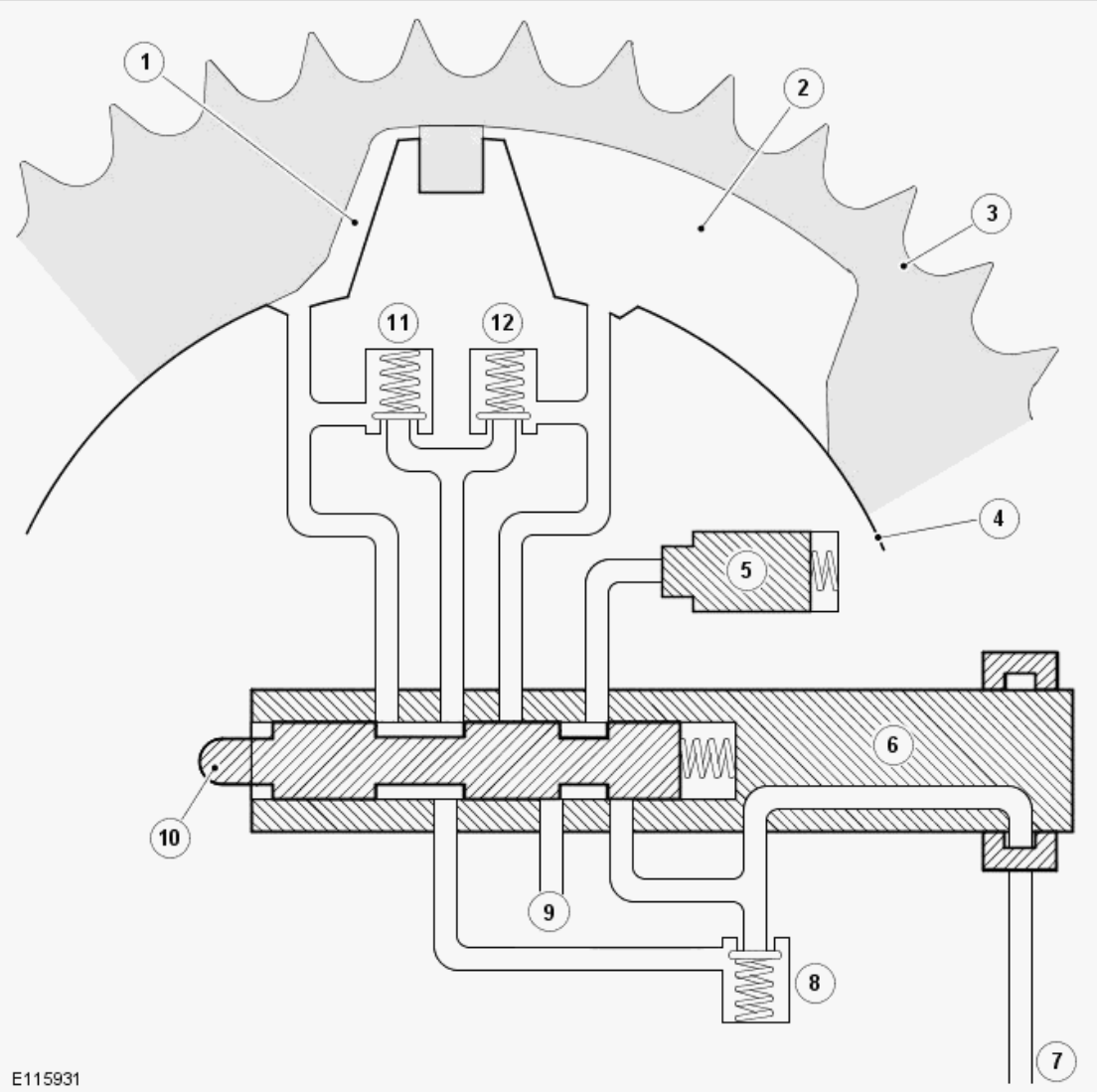
ITEM	DESCRIPTION
A	Camshaft torque
B	Camshaft rotation (degrees)
C	Valve opening
D	Peak lift
E	Valve closing
1	1000 rev/min
2	4000 rev/min
3	7000 rev/min
4	Inertia effects from valve train rotating components
5	Force caused by valve spring
6	Bias torque from friction

Variable Camshaft Timing Unit Schematic - Base Timing

cardiagn.com

NOTE:

Intake camshaft VCT unit shown. For exhaust camshaft VCT unit, read advance for retard and retard for advance.



ITEM	DESCRIPTION
1	Advance chamber
2	Retard chamber
3	Sprocket housing
4	Rotor assembly
5	Lock pin

cardiagn.com

6	Sleeve
7	Engine oil supply from camshaft
8	Inlet check valve
9	Lock pin drain
10	Spool valve
11	Advance check valve
12	Retard check valve

NOTE:

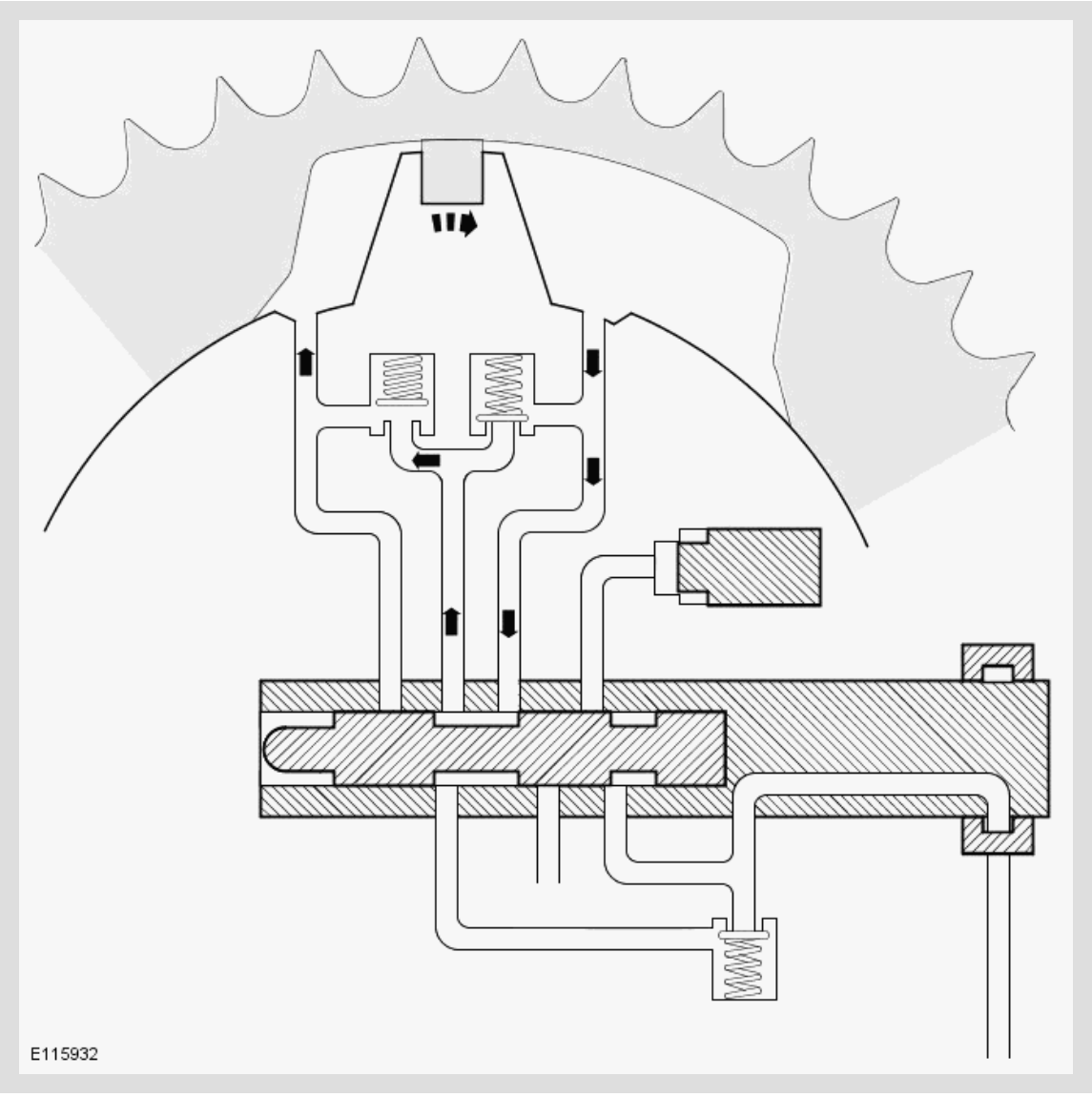
The following description is for intake camshaft VCT units. For exhaust camshaft VCT units, read advance for retard, and retard for advance.

At engine start-up, once the engine oil pressure in the camshaft is sufficient to open the inlet check valve, engine oil flows across the spool valve, through the advance and retard check valves and into the advance and retard chambers. During the start cycle, the ECM signals the VCT solenoid to move the spool valve into the sleeve and connect the lock pin to inlet oil pressure. The inlet oil pressure causes the lock pin to retract from the inner plate and unlock the rotor assembly and camshaft from the sprocket housing.

There is a constant supply of oil to the VCT to ensure the unit remains filled during operation.

Variable Camshaft Timing Unit Schematic - Advance

cardiagn.com



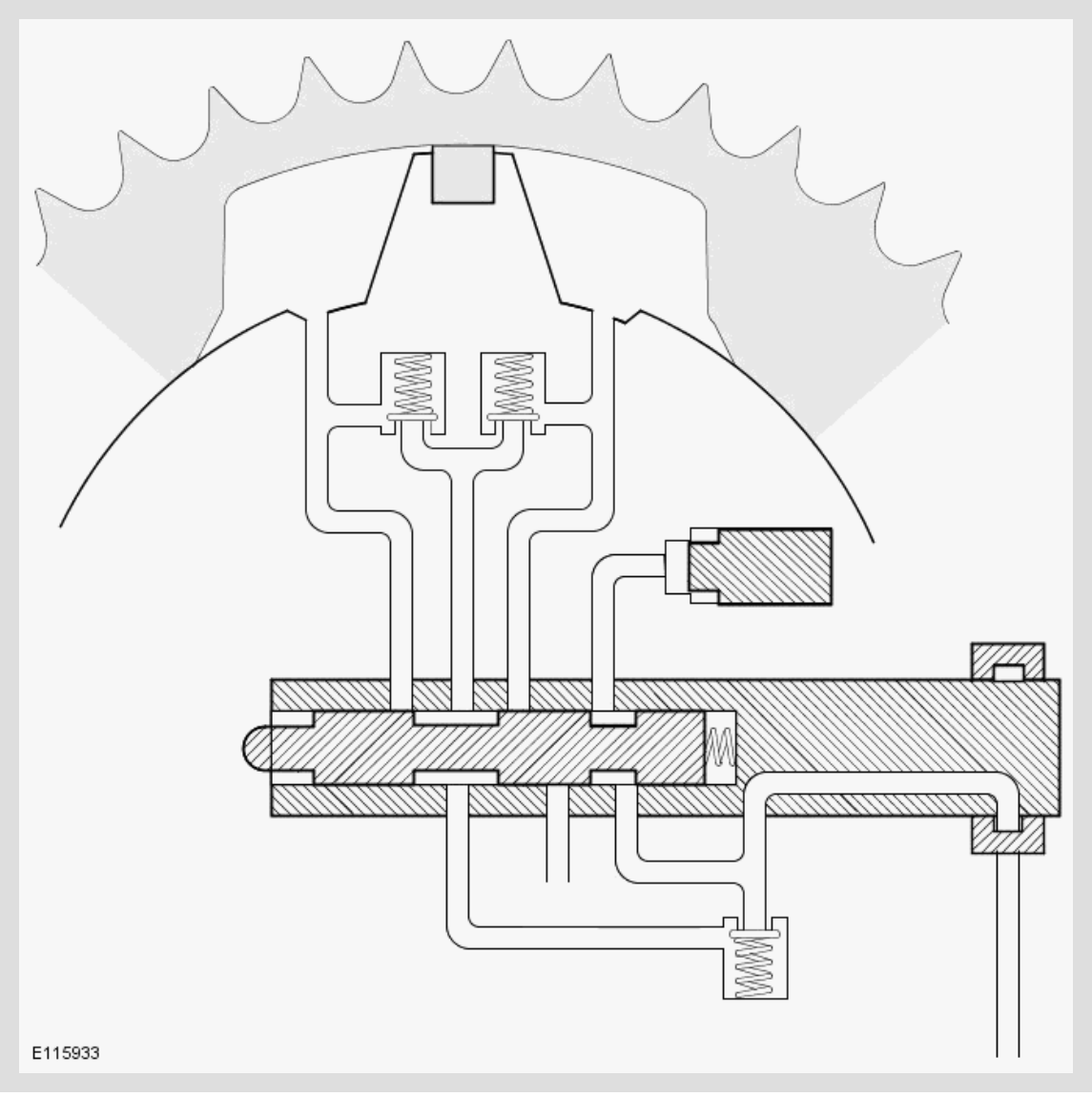
To advance the camshaft timing, the ECM adjusts the signal to the VCT solenoid to move the spool valve so that the advance chamber oil passage is closed and the retard chamber oil passage is connected to inlet oil.

Each momentary increase of the torque acting on the camshaft generates a pressure pulse in the retard chamber. Oil moves from the retard chamber, through the spool valve and the advance check valve

cardiagn.com

to the advance chamber, to equalize the pressures in the two chambers. The displacement of oil from the retard chamber causes the rotor assembly to advance in relation to the sprocket housing. Each momentary decrease of torque acting on the camshaft also generates a pressure pulse in the advance chamber, but, with the advance chamber oil passage closed, no movement of oil between the advance and retard chambers occurs and the rotor assembly cannot move in the retard direction.

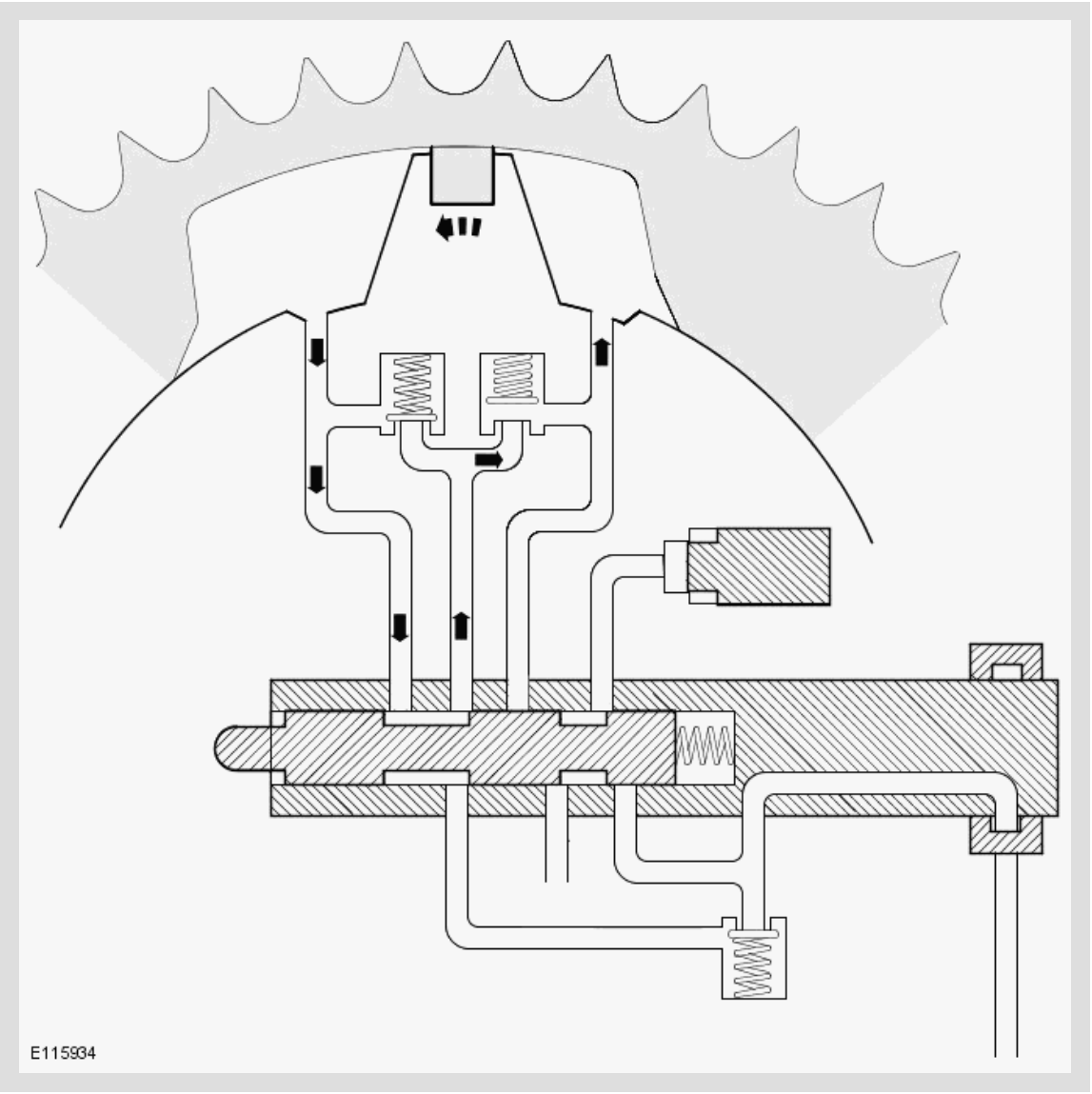
Variable Camshaft Timing Unit Schematic - Null



Once the camshaft has reached the required timing position the ECM adjusts the signal to the VCT solenoid to set the spool valve in the null position. In the null position, the advance and retard chamber oil passages are both closed by the spool valve and the rotor assembly is hydraulically locked to the sprocket housing.

cardiagn.com

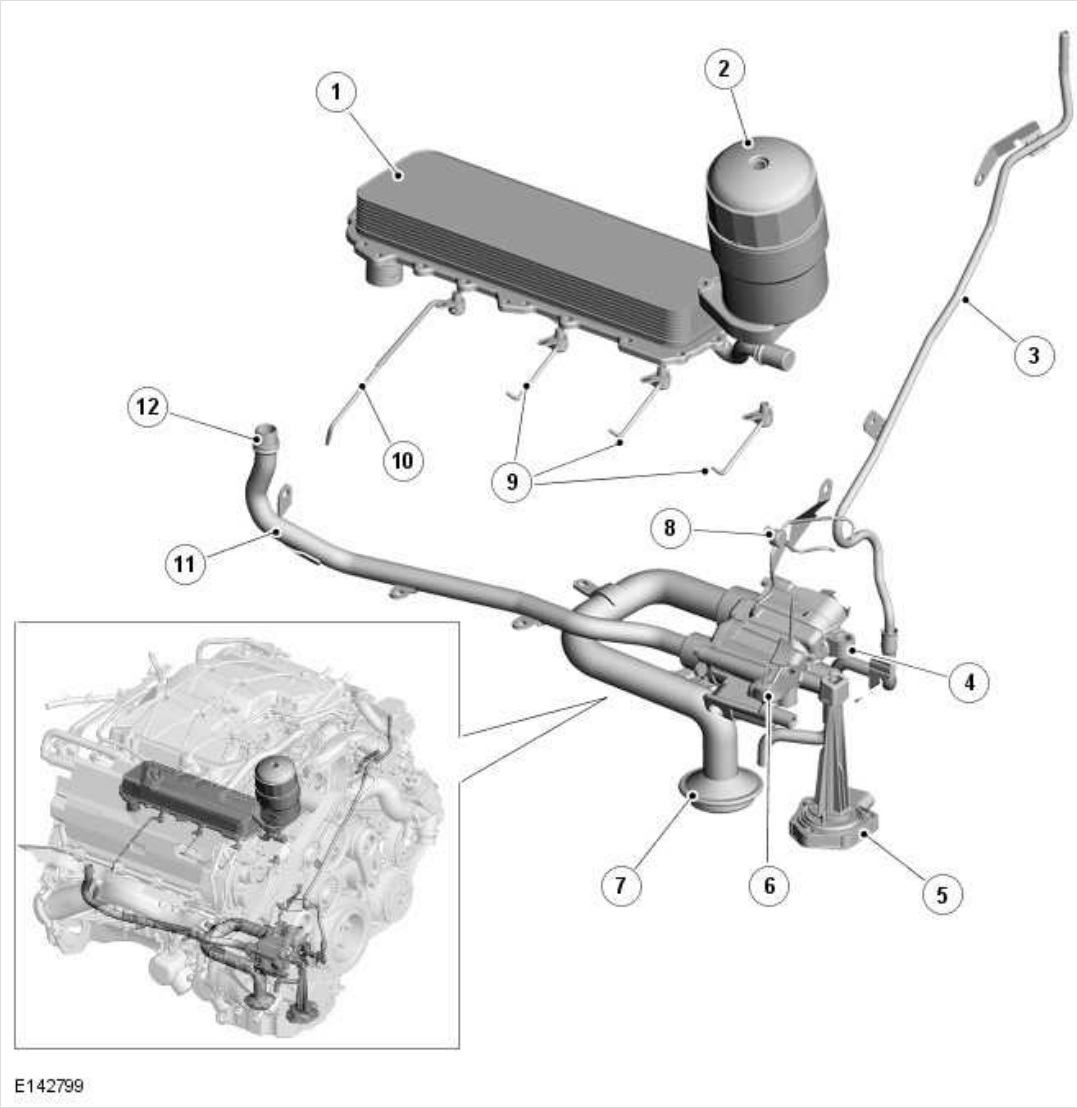
Variable Camshaft Timing Unit Schematic - Retard



To retard the camshaft timing, the ECM adjusts the signal to the VCT solenoid to move the spool valve to close the retard chamber oil passage and connect the advance chamber oil passage to the inlet oil.

Each momentary decrease of the torque acting on the camshaft causes oil to transfer from the advance chamber, through the spool valve and the retard check valve to the retard chamber, and so retard the camshaft timing.

cardiagn.com

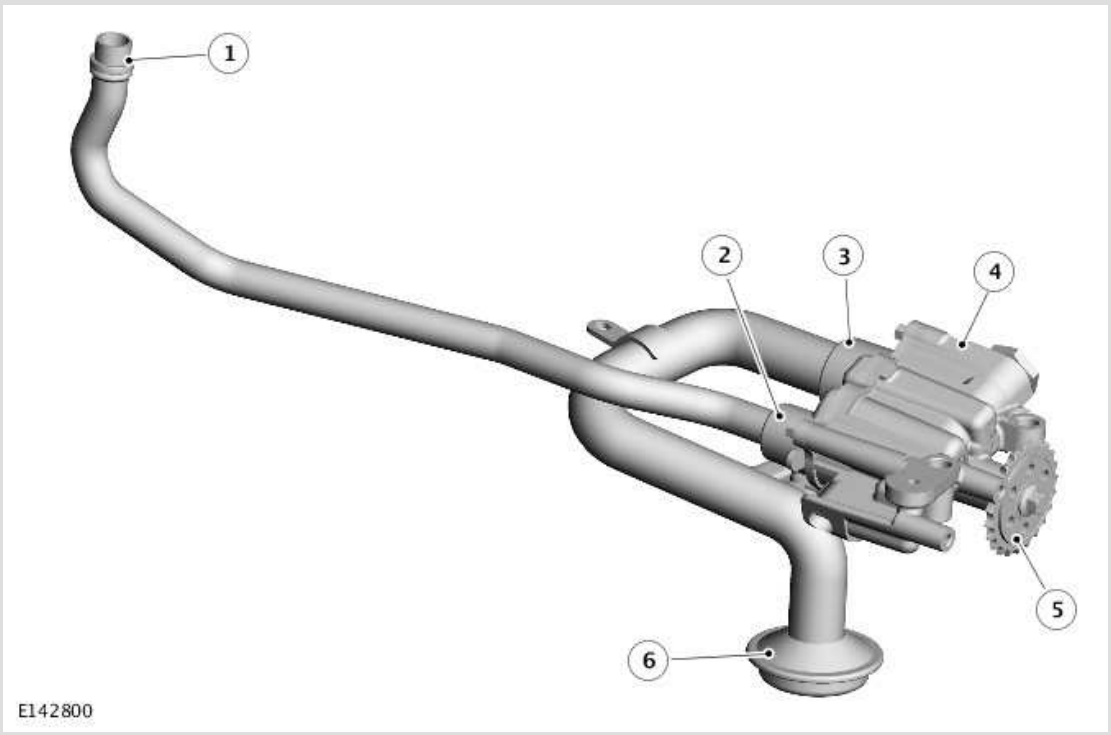


ITEM	DESCRIPTION
1	Oil cooler
2	Oil filter
3	Oil evacuation tube
4	Oil pump
5	Oil level and temperature sensor
6	Lower timing chain lubrication jet
7	Oil pick-up
8	Upper timing chain lubrication jet
9	Piston cooling jets

cardiagn.com

10	Rear dynamic balancer drive chain lubrication jet
11	Oil pump outlet tube
12	Outlet tube connection with right cylinder block

OIL PUMP



ITEM	DESCRIPTION
1	Pressurized oil outlet to cylinder block
2	Pump pressure outlet
3	Pump inlet
4	Oil pump
5	Oil pump drive sprocket
6	Oil pick-up pipe

The oil pump is attached to the underside of the windage tray with 3 bolts. The input shaft of the oil pump is driven from the front of the crankshaft, by the auxiliary chain, at 0.87 engine speed.

cardiagn.com

The oil pump draws oil from the oil pan through a centrally mounted pick-up pipe. The oil is pressurized and pumped through an output tube to the cylinder block. After passing through an anti-drain valve and a plate type oil cooler, the oil is filtered by a replaceable cartridge installed on the front of the right (bank 1) cylinder head.

The output from the oil filter is distributed through oil galleries in the cylinder heads and the cylinder block. All moving parts are lubricated by pressure or splash oil. Pressurized oil is also provided for the VCT system, the piston cooling jets and the timing chain lubrication jets.

The oil returns to the oil pan under gravity. Large drain holes through the cylinder heads and cylinder block ensure the rapid return of the oil to the oil pan. System replenishment is through the oil filler cap on the left cylinder head cover.

An oil evacuation tube is installed to allow oil to be drawn from the oil pan. The upper end of the oil evacuation tube is located under the oil filler cap.

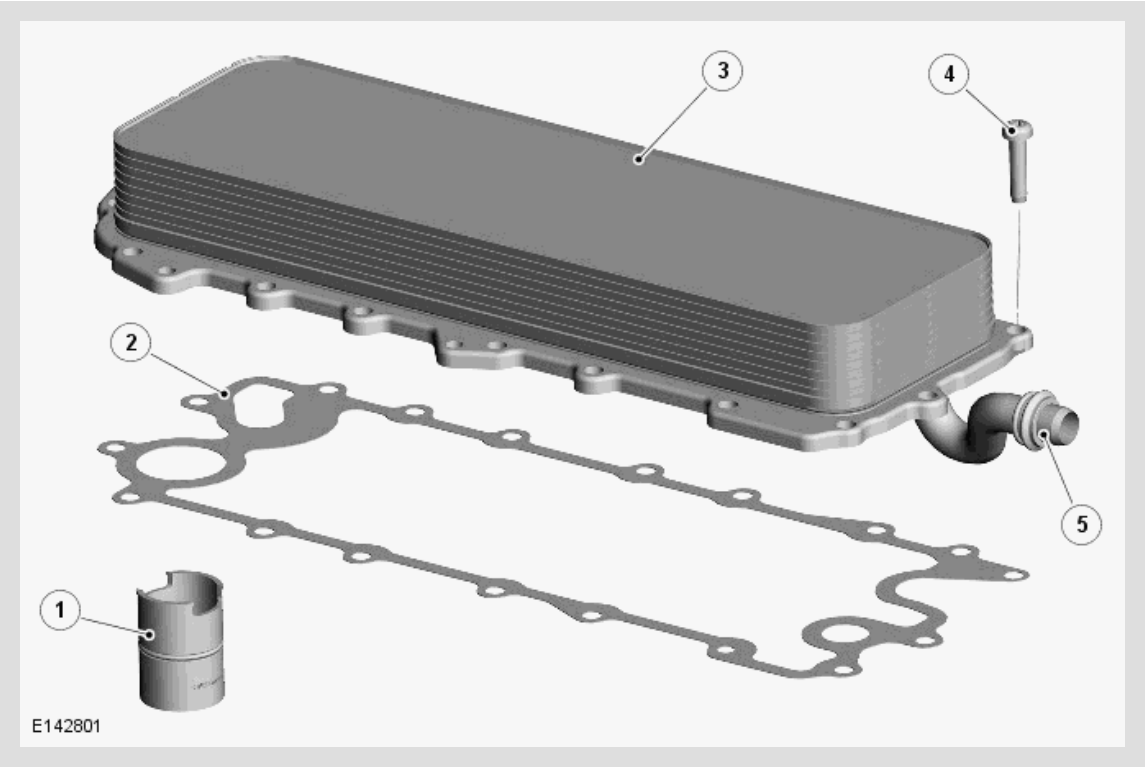
An oil drain plug is installed in the right side of the oil pan.

Oil Pump Nominal Operating Pressures

ENGINE SPEED, REV /MIN	TEMPERATURE, °C (° F)	PRESSURE, BAR (LBF/IN ^{2})
Idle	20 (68)	2.0 (29.0)
1500	20 (68)	6.0 (87.0)
3000	40 (104)	6.2 (90.0)
3000	110 (230)	5.0 (72.5)
3000	130 (266)	4.0 (58.0)

ENGINE OIL COOLER

cardiagn.com



ITEM	DESCRIPTION
1	Anti-drain valve assembly
2	Gasket
3	Engine oil cooler
4	Screw (18 off)
5	Engine coolant inlet from water pump

The engine oil cooler is located on the top of the cylinder block, in the 'V' between the cylinder heads. The cooler is sealed to the cylinder block with a gasket and secured with 18 screws.

There are four ports on the underside of the cooler; an engine oil inlet and outlet and an engine coolant inlet and outlet. The engine oil

cardiagn.com

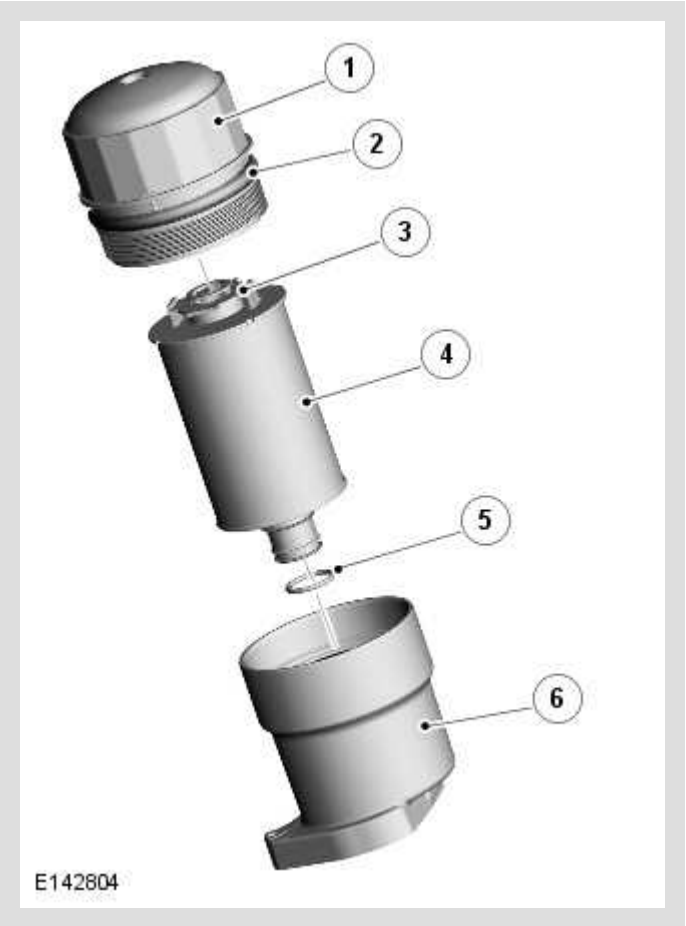
cooler is an aluminum housing comprising louvered fins and plates. The plates allow a cross-flow of engine oil and engine coolant through the cooler but keeping the two fluids separate.

The engine coolant is directed from the engine coolant pump into the cooler via a hose.

The plates are immersed in engine coolant from the engine coolant pump which provides cooling of the engine oil by the temperature differential between the engine oil and the engine coolant.

An anti-drain valve is located in the cylinder block and prevents the engine oil cooler draining of oil when the engine is not running.

ENGINE OIL FILTER



ITEM	DESCRIPTION
1	Cap
2	O-ring seal

cardiagn.com

3	By-pass filter
4	Filter element
5	O-ring seal
6	Oil filter body

The oil filter assembly is located on a casting which is integral with the right cylinder head. The oil filter body is sealed with a gasket and secured to the cylinder head with 3 screws.

A replaceable cartridge filter element is located in the oil filter body. An O-ring seal seals the filter element to the filter body.

The filter element is fitted with an integral by-pass valve. If the filter becomes contaminated, to the point that oil flow is restricted, the by-pass valve opens to allow oil to flow through the oil filter body to avoid starving the engine of engine oil.

OIL LEVEL MONITORING

cardiagn.com

The oil level and temperature sensor supplies the ECM with a signal containing the level of the oil in the oil pan. The oil level and temperature sensor is secured to the bottom of the oil pan with three screws and sealed with a gasket.

NOTE:

The temperature function of the oil level and temperature sensor is not operational on the 3.0L V6 S/C engine.

The oil level and temperature sensor sends an ultrasonic pulse vertically upward and measures the time taken for the pulse to be reflected back from the top surface of the oil. This time is compared with the time taken for an ultrasonic pulse to travel a reference distance within the oil level and temperature sensor to determine the oil level. The oil level reading is transmitted in a PWM signal to the ECM

Oil Level and Temperature Sensor Specifications

FEATURE	DETAILS
Power source	Battery Voltage
Temperature Accuracy	±2 °C (±3.6 °F)
Operating Level Range	114 to 147 mm (4.57 to 5.79 in.)
Operating Temperature Range	-40 to 160 °C (-40 to 320 °F)

OIL LEVEL CHECK

For additional information, refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

For accuracy, oil level checks should be performed with the vehicle on level ground when the oil is hot. The vehicle needs to stand for approximately 10 minutes, after the engine is switched off, to allow the oil to drain back into the oil pan and the oil level to stabilize. The oil level system will not give a reading until the oil level has stabilized.

cardiagn.com

To check the oil level, make sure that the ignition is on, the engine stopped and the transmission is in P (park). Access the vehicle information and settings menu and select **Service Menu** , then **Oil Level Display** . An **Engine Oil Level** image is displayed in the instrument cluster message center and shows the current oil level. One of the following messages will also be displayed:

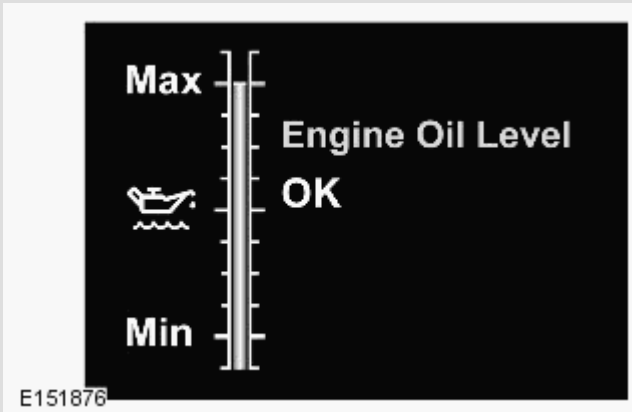
- If the oil level is within acceptable limits, the message **OK** is displayed.
- If the oil level is less than acceptable, a message advising how much oil to add is displayed e.g. **Add 0.5 Litre** or **Add 0.5 Quart** (depending on the market), or **Underfilled Refer to handbook for oil volume & type** .
- If the message **Engine Oil Level Overfilled** is displayed, the oil level must be reduced to within acceptable limits before starting the engine again.
- If the message **Engine Oil Level Underfilled** is displayed, 1.5 litres (2.6 pints) of oil, then recheck the oil level.
- If the message **Engine Oil Level Not Available** is displayed, the oil level is still stabilizing. Wait 10 minutes and then recheck level.
- If a warning message **ENGINE OIL LEVEL MONITOR SYSTEM FAULT** is displayed a system fault has occurred. Check for fault codes using the approved Jaguar diagnostic equipment.

- If the oil level is within acceptable limits, the message **OK** is displayed.
- If the oil level is less than acceptable, a message advising how much oil to add is displayed e.g. **Add 0.5 Litre Refer to handbook for oil type** or **Add 0.5 Quart Refer to handbook for oil type** (depending on the market), or **Underfilled Refer to handbook for oil volume & type** .
- If the message **Overfilled Refer to handbook** is displayed, the oil level must be reduced to within acceptable limits before starting the engine again.

cardiagn.com

- If the message **Not available** is displayed, the oil level is still stabilizing. Wait 10 minutes and then recheck level.

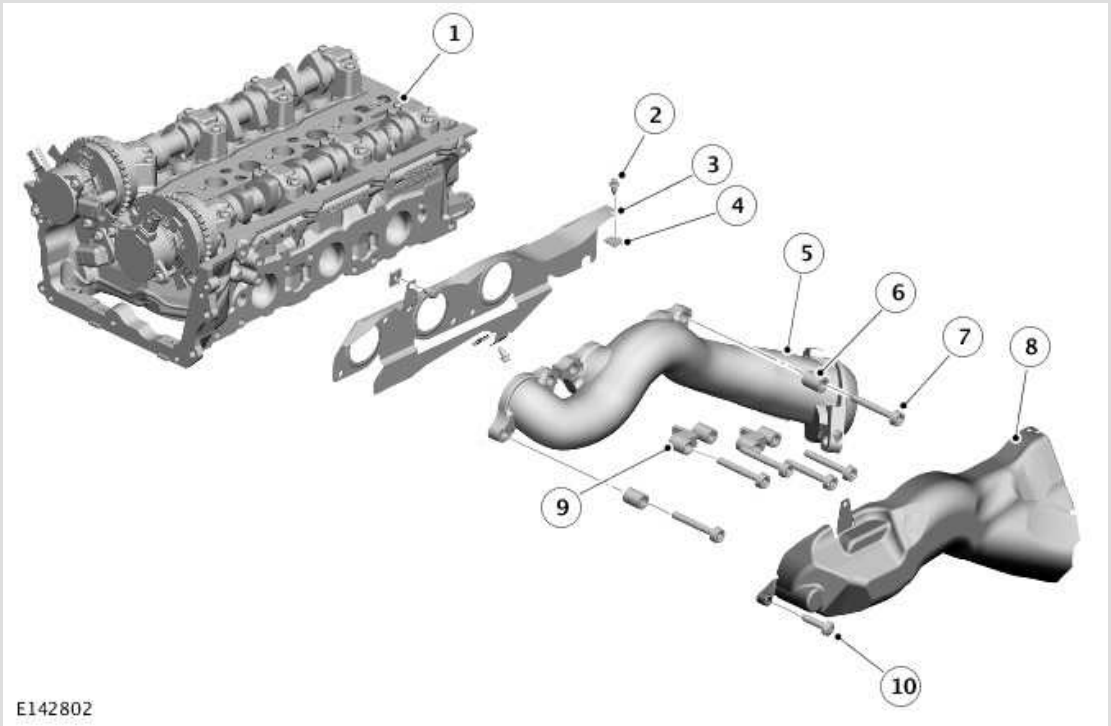
Oil Level Display



EXHAUST MANIFOLDS

NOTE:

Bank 2 installation shown, Bank 1 installation similar.



cardiagn.com

ITEM	DESCRIPTION
1	Cylinder head
2	Screw (3 off)
3	Layered gasket
4	Threaded insert (3 off)
5	Exhaust manifold
6	Spacer (4 off)
7	Bolt (6 off)
8	Heat shield
9	Machined spacer (2 off)

The high silicon molybdenum cast iron exhaust manifolds are unique for each cylinder bank. Each exhaust manifold installation includes a layered metal gasket and heat shields. Spacers on the securing bolts allow the manifolds to expand and contract with changes of temperature while maintaining the clamping loads.

OPERATION

Operation of the engine is controlled by the ECM .
For additional information, refer to: Electronic Engine Controls (303-14A Electronic Engine Controls - V6 S/C 3.0L Petrol, Description and Operation).

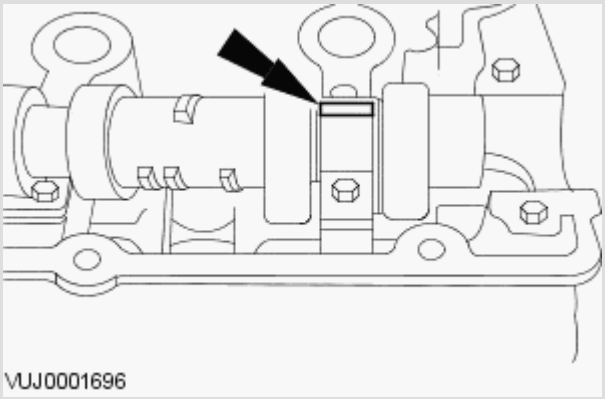
cardiagn.com

CAMSHAFT BEARING JOURNAL CLEARANCE (G61235)

GENERAL PROCEDURES

1. **NOTES:**

   - Make sure that the following stages are followed exactly. The tappets or followers must be removed to carry out this measurement.
   - Make sure that the camshaft is to specification.
   - The bearing caps and journals should be free from engine oil and dirt.



Position on a length of plastigage on the bearing cap.

Insert the camshaft, without lubrication, into the cylinder head.

Position a plastigage strip, which should be equal to the width of the bearing cap, on the bearing journal.

2. Install the camshaft bearing caps.

   Follow the relevant tightening sequence.

3. **NOTE:**

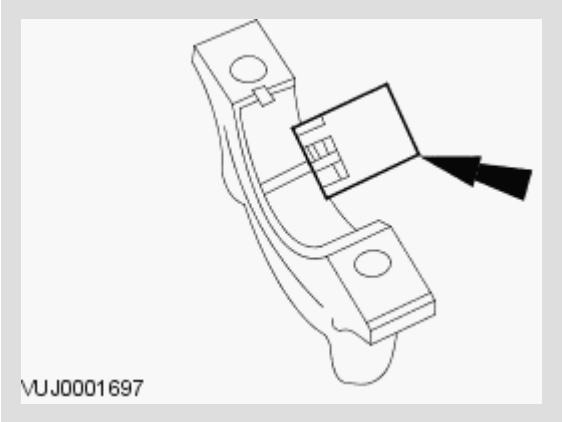
cardiagn.com

Do not strike the bearing caps.

Remove the camshaft bearing caps.

Follow the relevant loosening sequence.

4.



Using the special tool, read off the measurement.

Compare the width of plastigage with the plastigage scale.

The value that is read off is the bearing clearance.

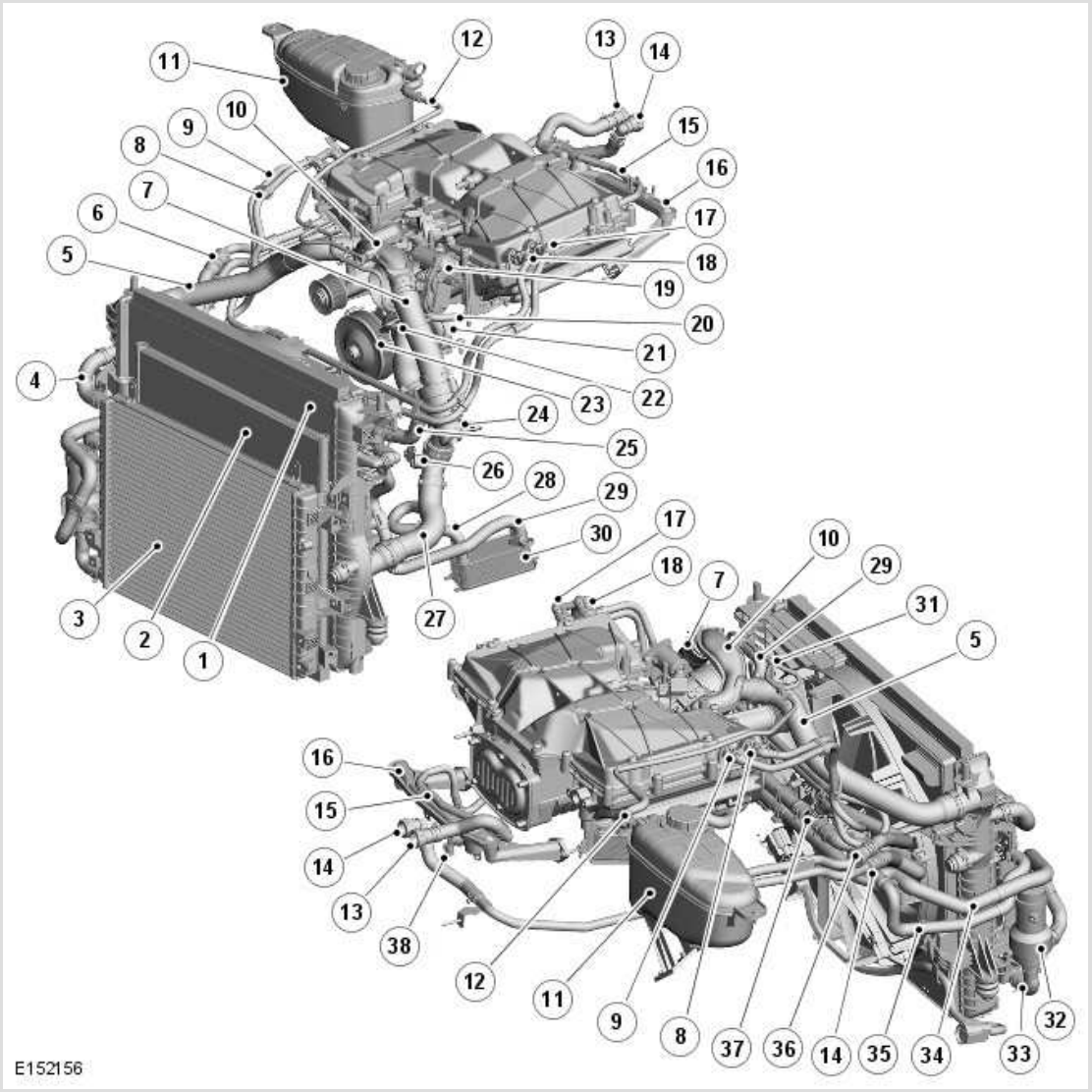
If the values are not to specification install a new camshaft.

cardiagn.com

ENGINE COOLING - V6 S/C 3.0L PETROL

DESCRIPTION AND OPERATION

COMPONENT LOCATION - REST OF WORLD (ROW)



ITEM	DESCRIPTION
1	Radiator
2	Air conditioning condensor (reference only)
3	Charge air cooler (reference only)
4	Hose - charge air cooler to radiator - supply
5	Radiator upper hose
6	Engine coolant return hose
7	Hose - thermostat housing to water supply tube
8	Hose - supercharger to charge air cooler - return
9	Hose - charge air cooler to supercharger - supply

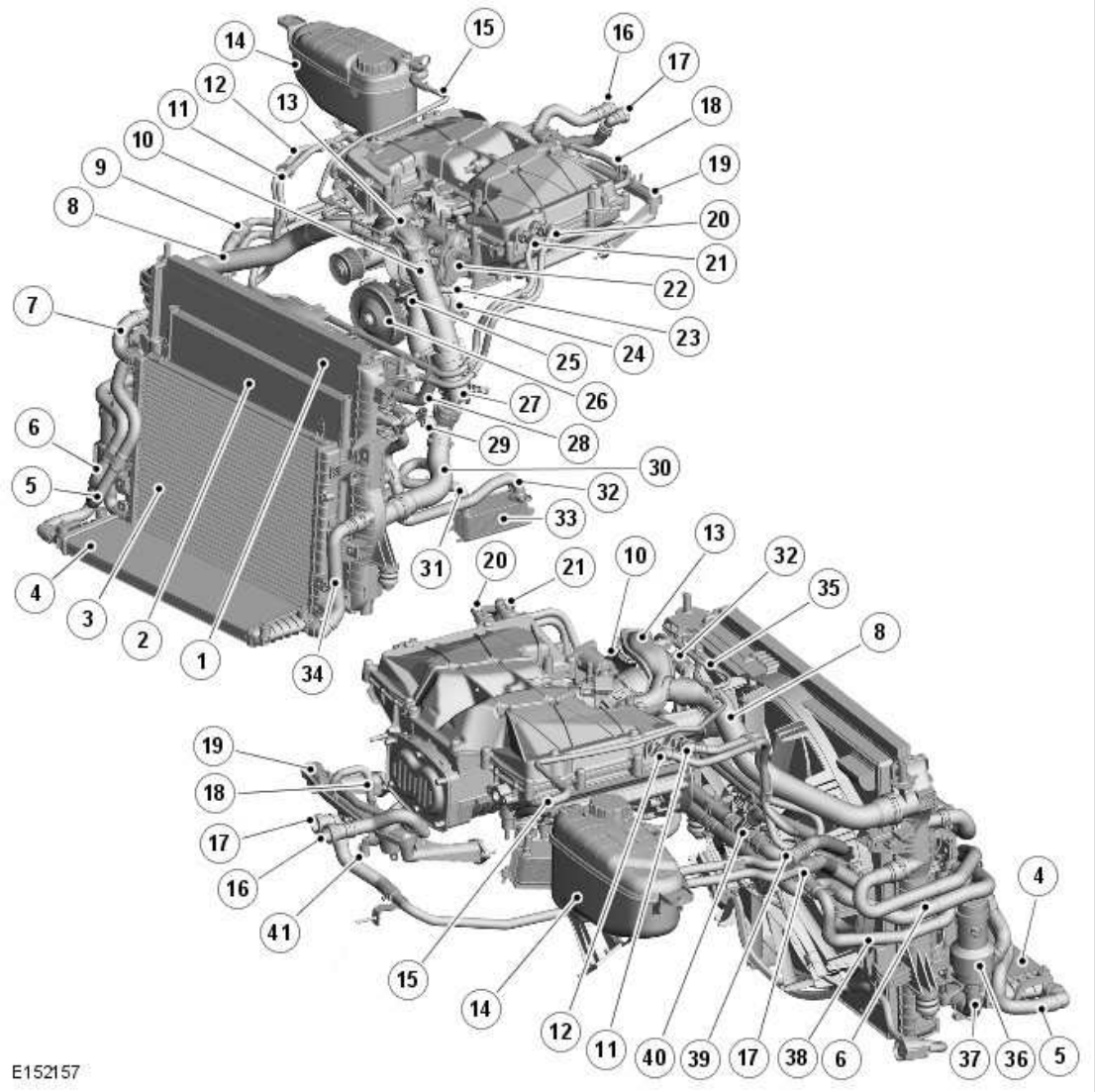
cardiagn.com

10	Water supply tube
11	Coolant expansion tank
12	Air bleed hose connection to coolant expansion tank
13	Hose - heater core supply
14	Hose - heater core return
15	Hose - throttle body heater return
16	Heater supply manifold
17	Hose - charge air cooler to supercharger - supply
18	Hose - supercharger to charge air cooler - return
19	Throttle body
20	Hose - throttle body heater return
21	Water outlet tube
22	Hose - throttle body heater supply
23	Coolant pump
24	Thermostat housing
25	Hose coolant return
26	Engine coolant temperature (ECT) sensor 2
27	Radiator - lower hose
28	Hose - Automatic Transmission Fluid (ATF) cooler outlet
29	Hose ATF cooler inlet
30	ATF cooler
31	Hose - air bleed
32	Charge air coolant pump
33	Hose - charge air cooler inlet
34	Hose - charge air cooler to supercharger - supply
35	Hose - charge air cooler to radiator - return
36	Hose - heater core return
37	Coolant return 'Y' connector

cardiagn.com

38	ECT sensor 1

COMPONENT LOCATION - HOT CLIMATE MARKETS



ITEM	DESCRIPTION
1	Radiator
2	Air conditioning condensor (reference only)
3	Charge air cooler (reference only)
4	Auxiliary radiator
5	Auxiliary radiator inlet hose
6	Hose - charge air cooler to supercharger - supply
7	Hose - charge air cooler to radiator - supply

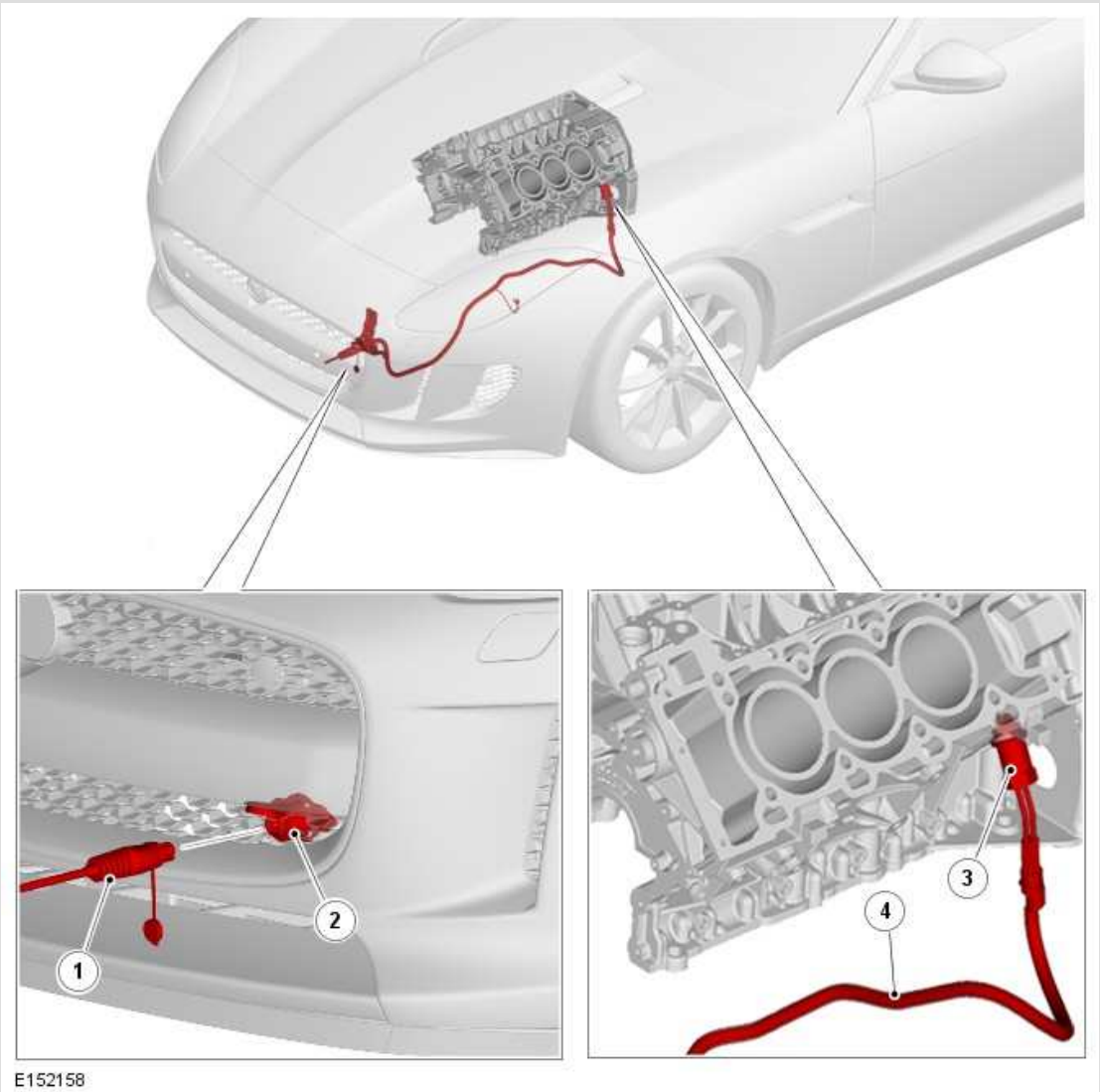
cardiagn.com

8	Radiator upper hose
9	Engine coolant return hose
10	Hose - thermostat housing to water supply tube
11	Hose - supercharger to charge air cooler - return
12	Hose - charge air cooler to supercharger - supply
13	Water supply tube
14	Coolant expansion tank
15	Air bleed hose connection to coolant expansion tank
16	Hose - heater core supply
17	Hose - heater core return
18	Hose - throttle body heater return
19	Heater supply manifold
20	Hose - charge air cooler to supercharger - supply
21	Hose - supercharger to charge air cooler - return
22	Throttle body
23	Hose - throttle body heater return
24	Water outlet tube
25	Hose - throttle body heater supply
26	Coolant pump
27	Thermostat housing
28	Hose coolant return
29	Engine coolant temperature (ECT) sensor 2
30	Radiator - lower hose
31	Hose - Automatic Transmission Fluid (ATF) cooler outlet
32	Hose ATF cooler inlet
33	ATF cooler
34	Hose - auxiliary radiator outlet
35	Hose - air bleed
36	Charge air coolant pump

cardiagn.com

37	Hose - charge air cooler inlet
38	Hose - charge air cooler to radiator - return
39	Hose - heater core return
40	Coolant return 'Y' connector
41	ECT sensor 1

COMPONENT LOCATION - ENGINE CYLINDER BLOCK HEATER



E152158

ITEM	DESCRIPTION
1	Power supply connector
2	Vehicle connector

cardiagn.com

3	Block heater
4	Harness

OVERVIEW

The engine cooling system maintains the engine within an optimum temperature range under changing ambient and engine operating conditions. The system is a pressurized expansion tank system with continuous bleeds to separate air from the coolant and prevent the formation of air locks. The engine cooling system also provides:

- Heating for:
  - The passenger compartment.
    For additional information, refer to: Heating and Ventilation (412-01 Climate Control, Description and Operation).
  - The throttle body.
- • Cooling for:
  - The engine oil cooler.
    For additional information, refer to: Engine (303-01B Engine - V8 S/C 5.0L Petrol, Description and Operation).
  - The engine.
    For additional information, refer to: Engine (303-01B Engine - V8 S/C 5.0L Petrol, Description and Operation).
  - The Automatic Transmission Fluid (ATF) cooler.
    For additional information, refer to: Transmission Cooling (307-02A Transmission/Transaxle Cooling - V6 S/C 3.0L Petrol, Description and Operation).

The primary components of the engine cooling system are the:

- Coolant pump
- Thermostat
- Radiator
- Electric cooling fan

cardiagn.com

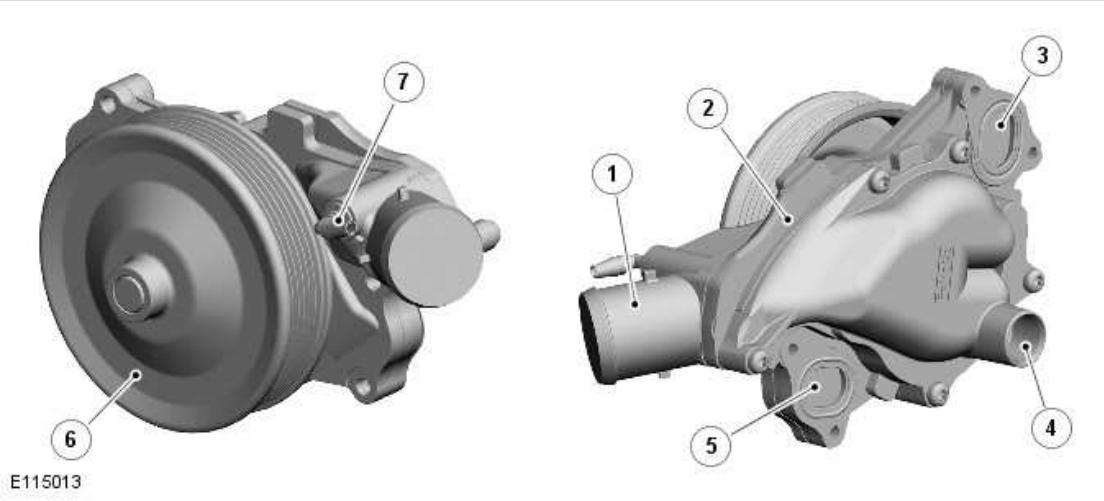
- Coolant expansion tank
- Engine oil cooler
- Outlet tube and heater manifold
- Connecting hoses and pipes.

An auxiliary cooler is installed on vehicles in some hot climate markets. The auxiliary cooler is located in front of the radiator.

In vehicle markets subject to very cold climatic conditions, an engine block heater can be installed.

DESCRIPTION

COOLANT PUMP



ITEM	DESCRIPTION
1	Inlet connection
2	Pump body
3	Outlet flange to right cylinder head
4	Outlet to engine oil cooler
5	Outlet flange to left cylinder head
6	Pulley

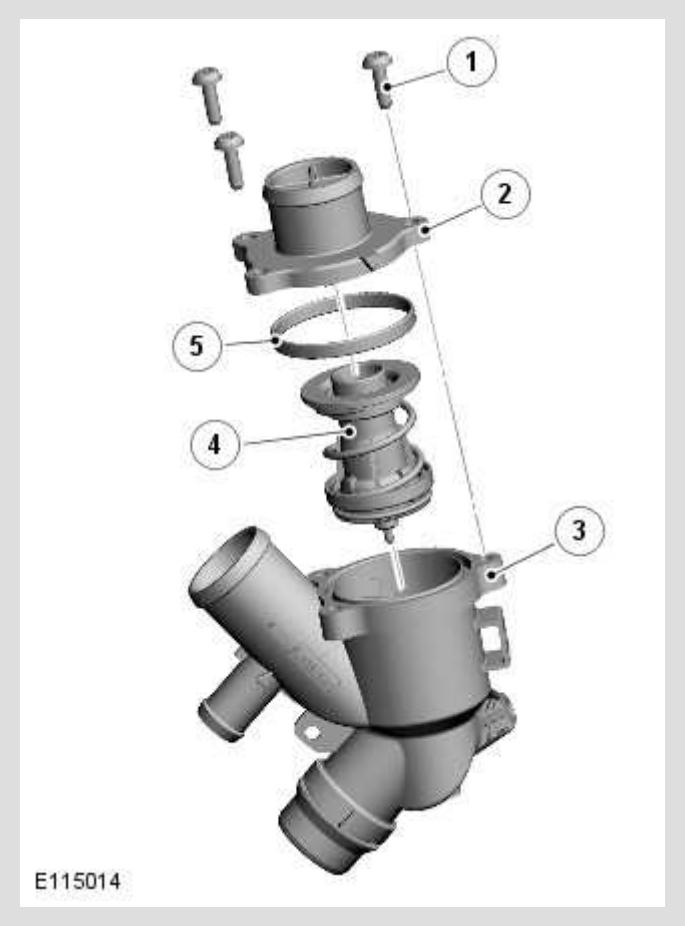
cardiagn.com

7	Bleed pipe connection (including check valve)

The body of the coolant pump contains an impeller attached to a shaft supported in a bearing assembly. The impeller is driven by a pulley, pressed on to the front of the shaft, which is driven by the accessory drive belt.
For additional information, refer to: Accessory Drive (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Description and Operation).

Two coolant outlet flanges attach the coolant pump to the front of the cylinder heads. A bleed connector is installed in the front of the coolant pump, adjacent to the coolant inlet connection from the thermostat. A check valve is incorporated into the bleed connection.

THERMOSTAT HOUSING



ITEM	DESCRIPTION
1	Screw (3 off)
2	Lower body

cardiagn.com

3	Upper body
4	Thermostat
5	Seal

The thermostat is a multi-stage device located in the coolant pump inlet to provide fast response and control of the engine outlet temperature.

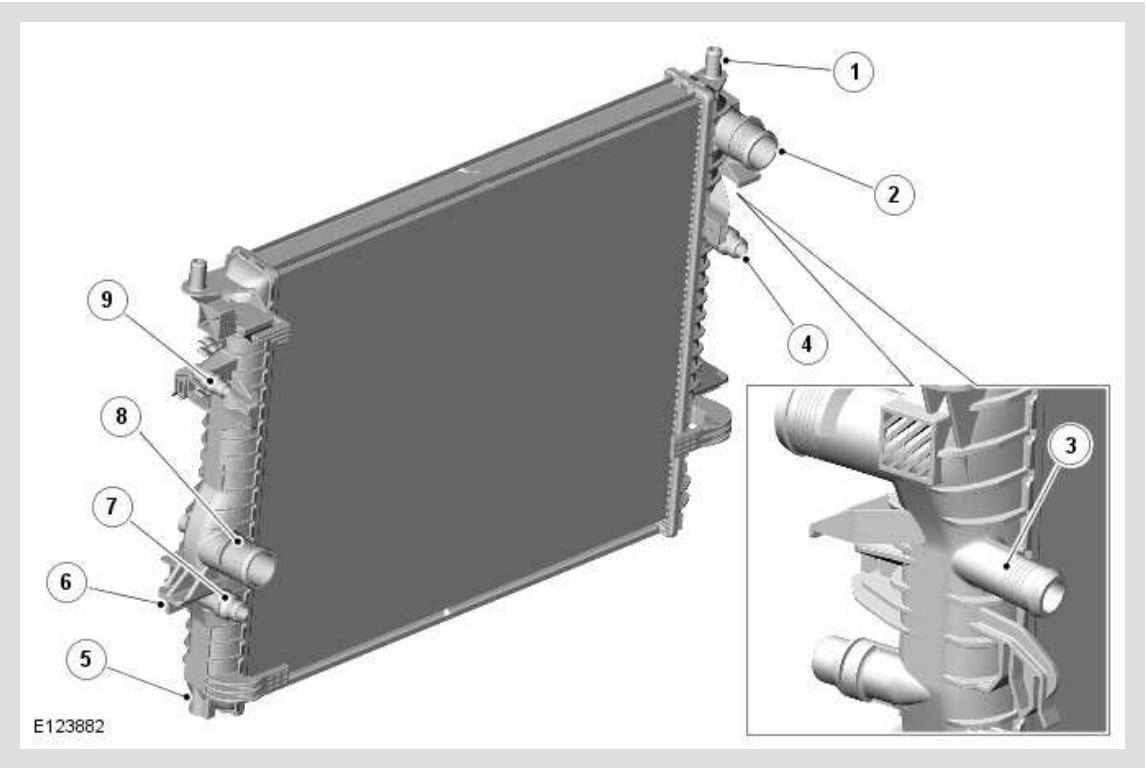
The thermostat housing has 4 connections. The lower connection receives a quick fit connector which receives coolant from the radiator lower hose and the automatic transmission fluid cooler. The larger upper connection is connected via a hose, water supply tube and water outlet to the cylinder block. The flow from this connection is governed by the thermostat. A connection at the side provides flow to the coolant pump and a smaller connection from this receives coolant return from the heater core and the coolant expansion tank.

The thermostat allows rapid engine warm-up by preventing coolant flow through the radiator and by limiting coolant flow through the cylinder block when the engine is cold. During warm-up and at engines speeds above approximately 3500 rev/min, a by-pass valve opens to control the coolant flow and pressure, to protect the engine components. When the thermostat opening reaches 6 mm (0.24 in.), the by-pass flow is shut-off. When the thermostat opening exceeds 6 mm (0.24 in.), the radiator coolant flow is further controlled up to the point where the thermostat is fully open. At this point maximum radiator coolant flow is achieved to provide maximum cooling.

The thermostat begins to open at 88 - 90 °C (190 - 194 °F) and is fully open at 102 °C (216 °F).

RADIATOR

cardiagn.com



ITEM	DESCRIPTION
1	Locating spigot (2 off)
2	Upper hose connection
3	Supercharger cooling system connection
4	Auxiliary radiator inlet hose connection
5	Drain plug
6	Support (2 off)
7	Auxiliary radiator outlet hose connection
8	Lower hose connection
9	Automatic transmission fluid cooler outlet hose connection

The radiator is a cross flow type with an aluminum core and plastic end tanks. The radiator is part of the cooling module and is attached

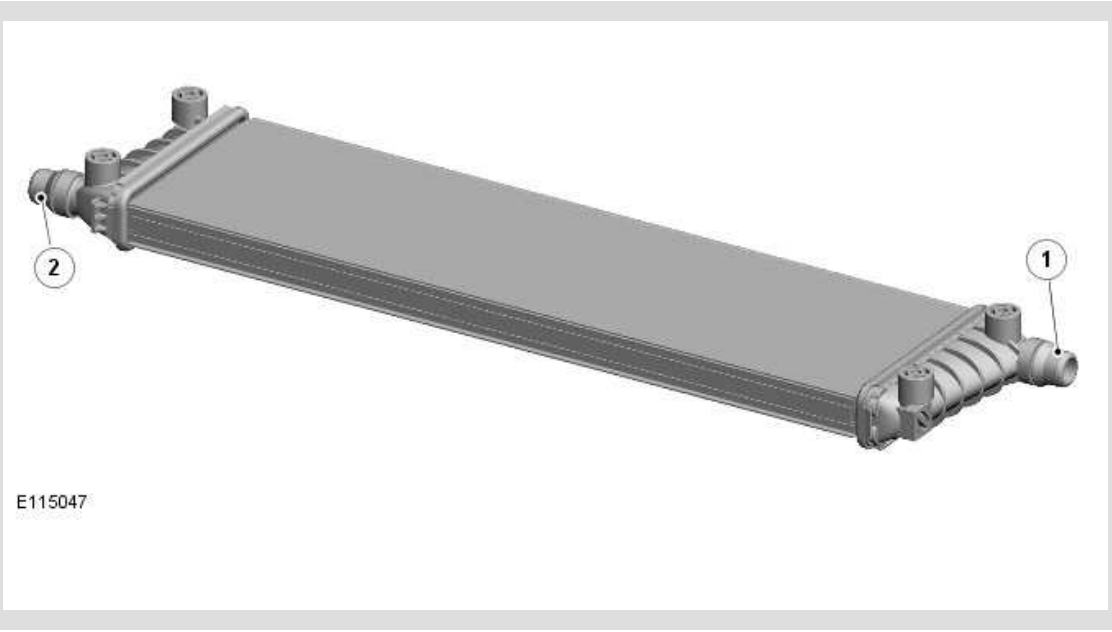
cardiagn.com

to the vehicle by locating spigots and supports integrated into the end tanks. The supports are installed in rubber bushes located in mounting brackets on the front subframe. The locating spigots are installed in rubber bushes located in mounting brackets on the front cross member.

The two end tanks incorporate connections for the upper and lower hoses, the coolant supply hose of the transmission fluid cooler and the supply and return hoses of the auxiliary radiator(s). A drain plug is installed in the bottom of the left end tank.

The upper section of the radiator is separated to supply only the ATF (automatic transmission fluid) cooler. The left end tank of the radiator is partitioned and coolant from this part of the radiator is directed to the ATF cooler.

AUXILIARY RADIATOR (WHERE FITTED)



ITEM	DESCRIPTION
1	Supply hose connection
2	Return hose connection

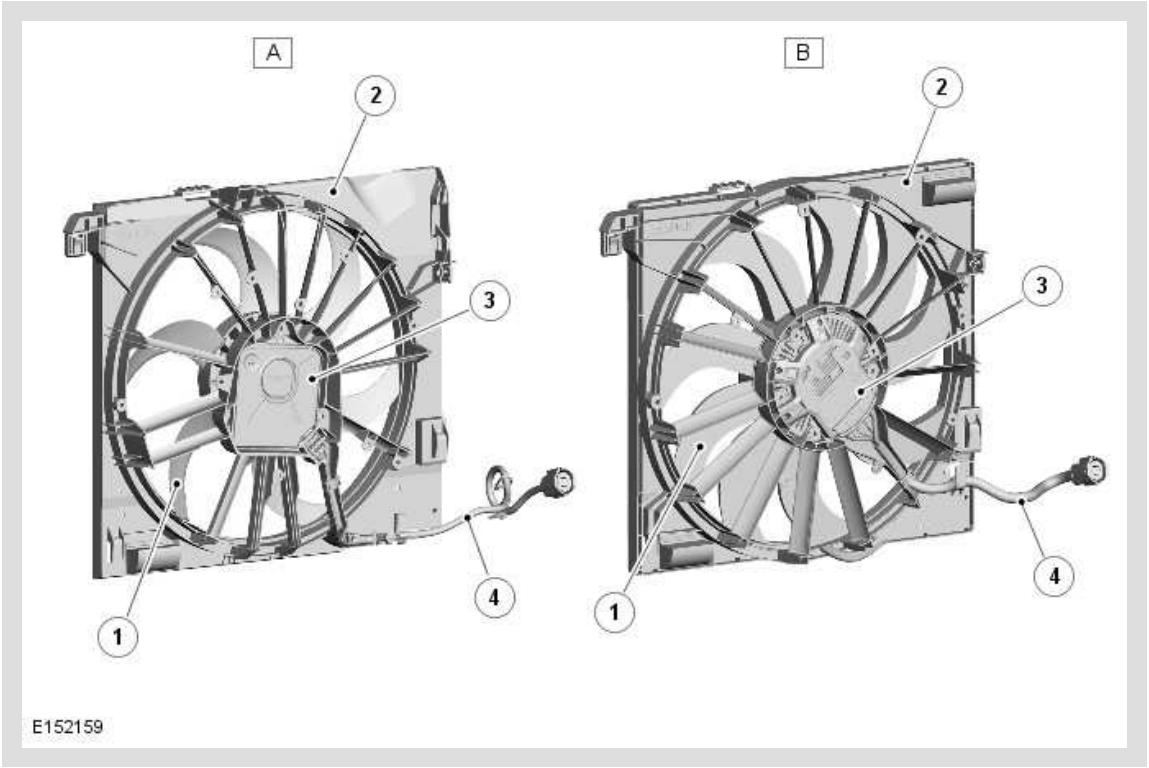
cardiagn.com

The auxiliary radiator is connected in parallel with the (main) radiator to increase the engine cooling capacity on hot climate market vehicles.

The auxiliary radiator is mounted horizontally in an air deflector attached to the front of the charge air radiator. The two end tanks of the auxiliary radiator incorporate connections for the supply and return hoses that connect it to the main radiator.

The auxiliary radiator is attached to the air deflector with four flange head bolts. The air deflector is attached to the radiator.

ELECTRIC COOLING FAN



ITEM	DESCRIPTION
A	500W Rest Of World (ROW)
B	850W Hot climate
1	Fan
2	Shroud
3	Engine cooling fan control module
4	Harness

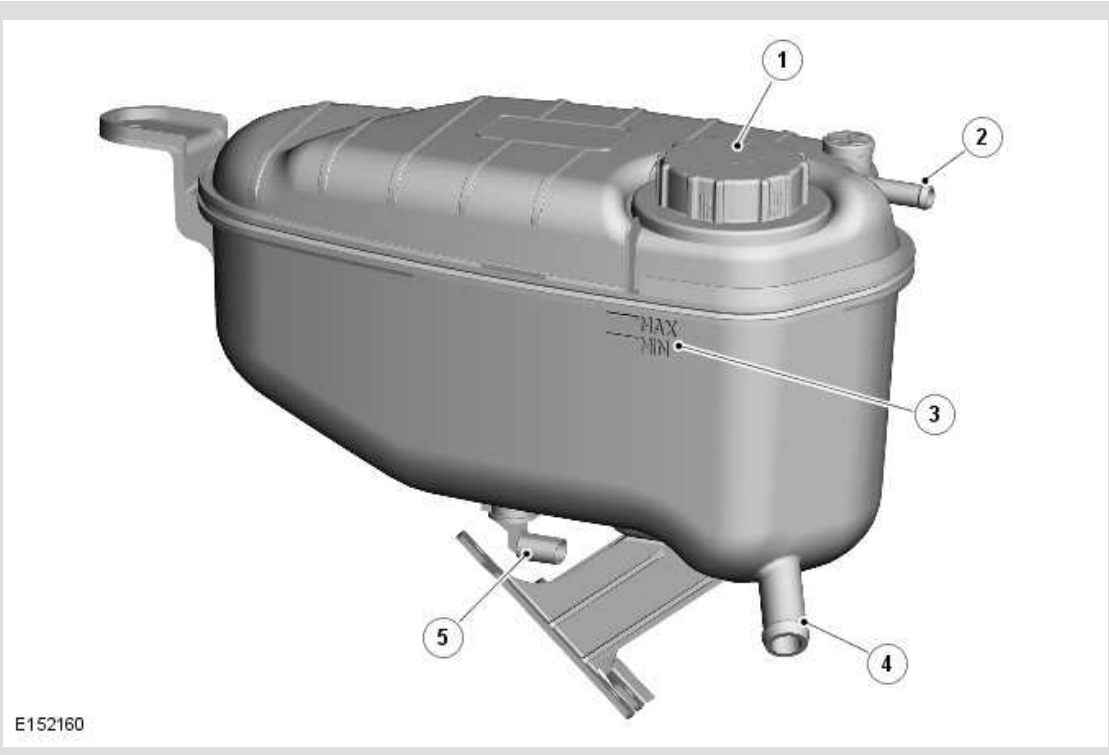
cardiagn.com

A variable speed electric cooling fan is installed in a shroud attached to the rear of the radiator.

Two variants of the cooling fan are available; ROW markets have a 500W cooling fan. Hot climate markets are fitted with an 850W cooling fan. The fan in these markets have more blades than the ROW fan and the shroud has an additional air vent in the top right of the shroud to allow additional air flow into the engine compartment.

The cooling fan is operated by the engine cooling fan control module which, is integrated into the electric motor. The control module is controlled by the ECM (engine control module) which outputs a PWM (pulse width modulation) signal to control the fan operating speed. An electrical connector at the right side of the shroud provides the interface between the electric cooling fan harness and the vehicle wiring.

ENGINE COOLANT EXPANSION TANK



ITEM	DESCRIPTION
1	Filler cap
2	Air bleed hose connection

cardiagn.com

3	Minimum and maximum level markings
4	Expansion hose connection
5	Engine coolant level sensor

The engine coolant expansion tank is installed in the rear right of the engine compartment.

A filler cap and level sensor are incorporated into the expansion tank. A 'MAX' and 'MIN' cold fill level markings are molded into the exterior of the tank below the filler cap.

The expansion tank provides the following functions:

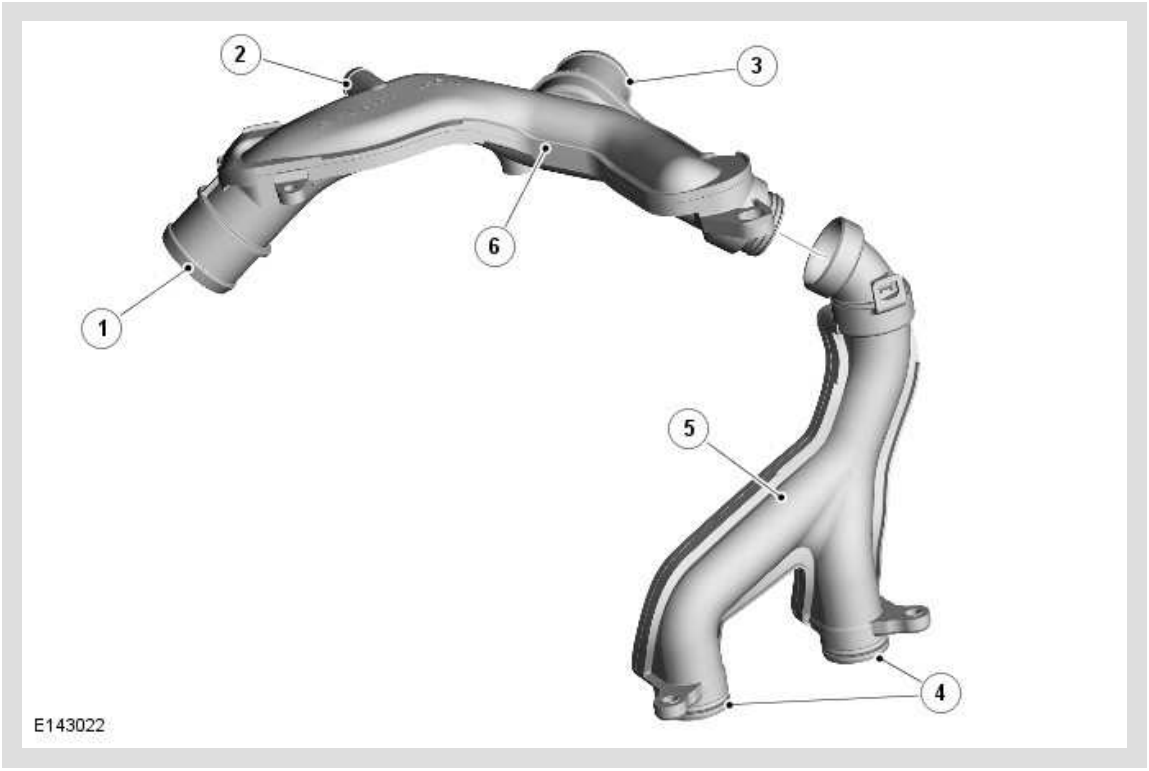
- Service fill.
- Coolant expansion during warm-up.
- Air separation during operation.
- System pressurization by the filler cap.

The engine coolant expansion tank has an air space of approximately 0.5 liter (1.06 US pints), above the MAX level, to allow for coolant expansion.

ENGINE COOLANT OUTLET TUBE AND HEATER MANIFOLD

Engine Coolant Outlet Tube

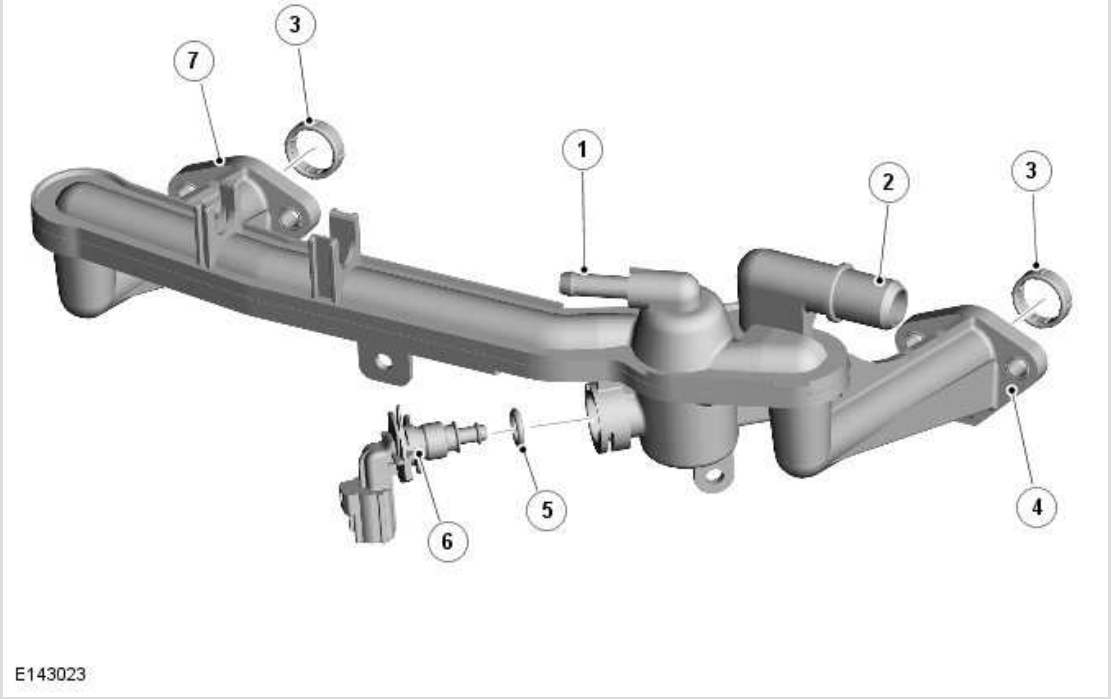
cardiagn.com



ITEM	DESCRIPTION
1	Thermostat hose connection
2	Air bleed hose connection
3	Radiator upper hose connection
4	Cylinder block connections
5	Water outlet tube
6	Water supply tube

cardiagn.com

Heater Manifold



ITEM	DESCRIPTION
1	Throttle body heater hose connection
2	Heater core supply hose connection
3	Seal (2 off)
4	Right cylinder head connection
5	O-ring seal
6	Engine Coolant Temperature (ECT) sensor 1
7	Left cylinder head connection

The engine coolant outlet tube routes hot engine coolant from the engine to the radiator top hose when the thermostat is open.

The heater manifold is connected to the rear of each cylinder head. Hot coolant from the engine is routed through the manifold into the heater core.

ENGINE COOLANT

cardiagn.com

The engine coolant is formulated to last for ten years or 240,000 km (150,000 miles). The coolant is silicate free and must not be mixed with conventional engine coolant.

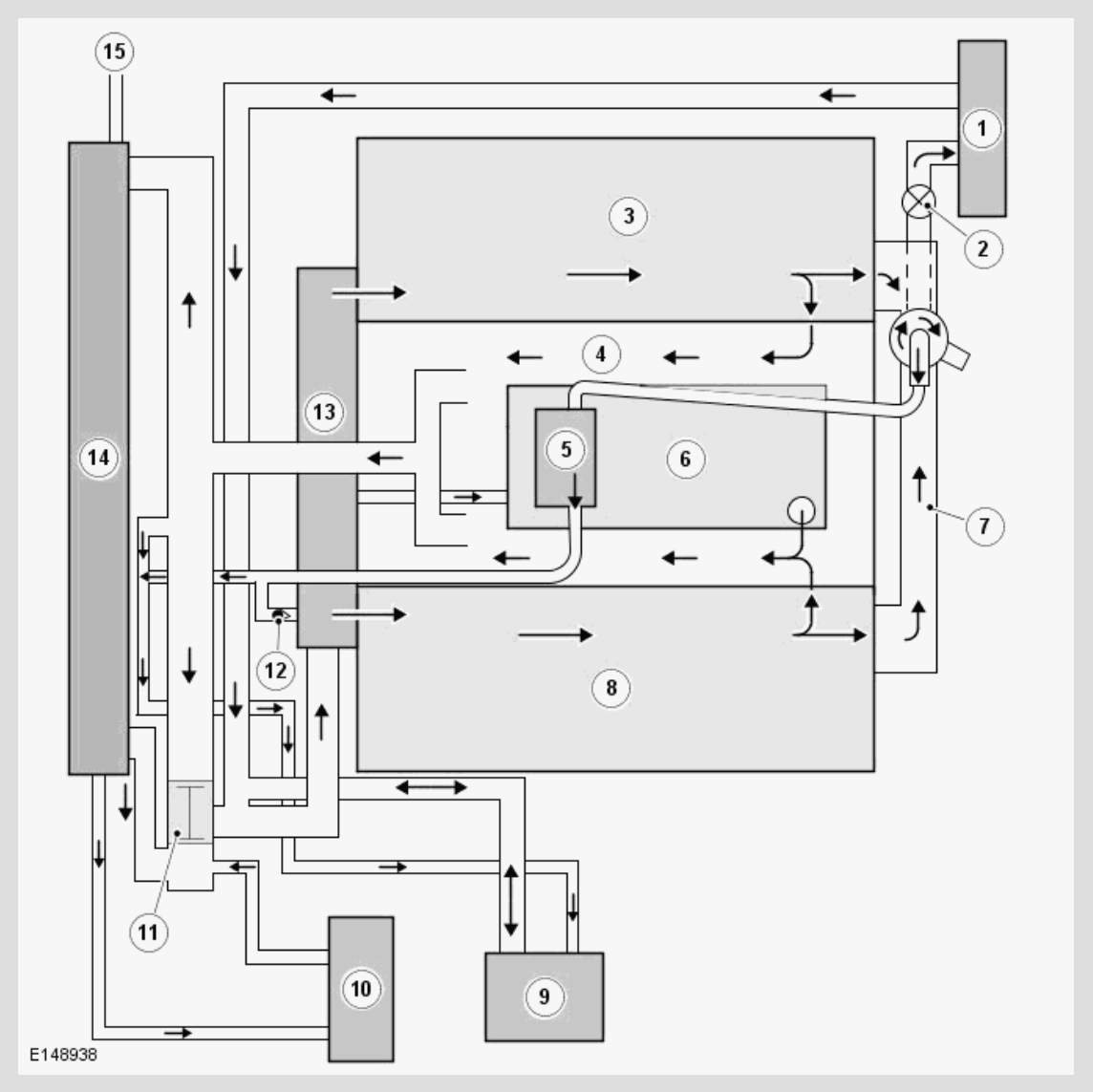
ENGINE BLOCK HEATER

For vehicle markets subject to very cold climatic conditions, an engine block heater is installed in place of the cylinder block drain plug. The engine block heater is either a 110 V ac or 240 V ac electric heater element, depending on the market, which can be connected to a domestic power supply via a connector in the lower part of the radiator grille of the front bumper.

OPERATION

Engine Cooling Flow Diagram - ROW

cardiagn.com

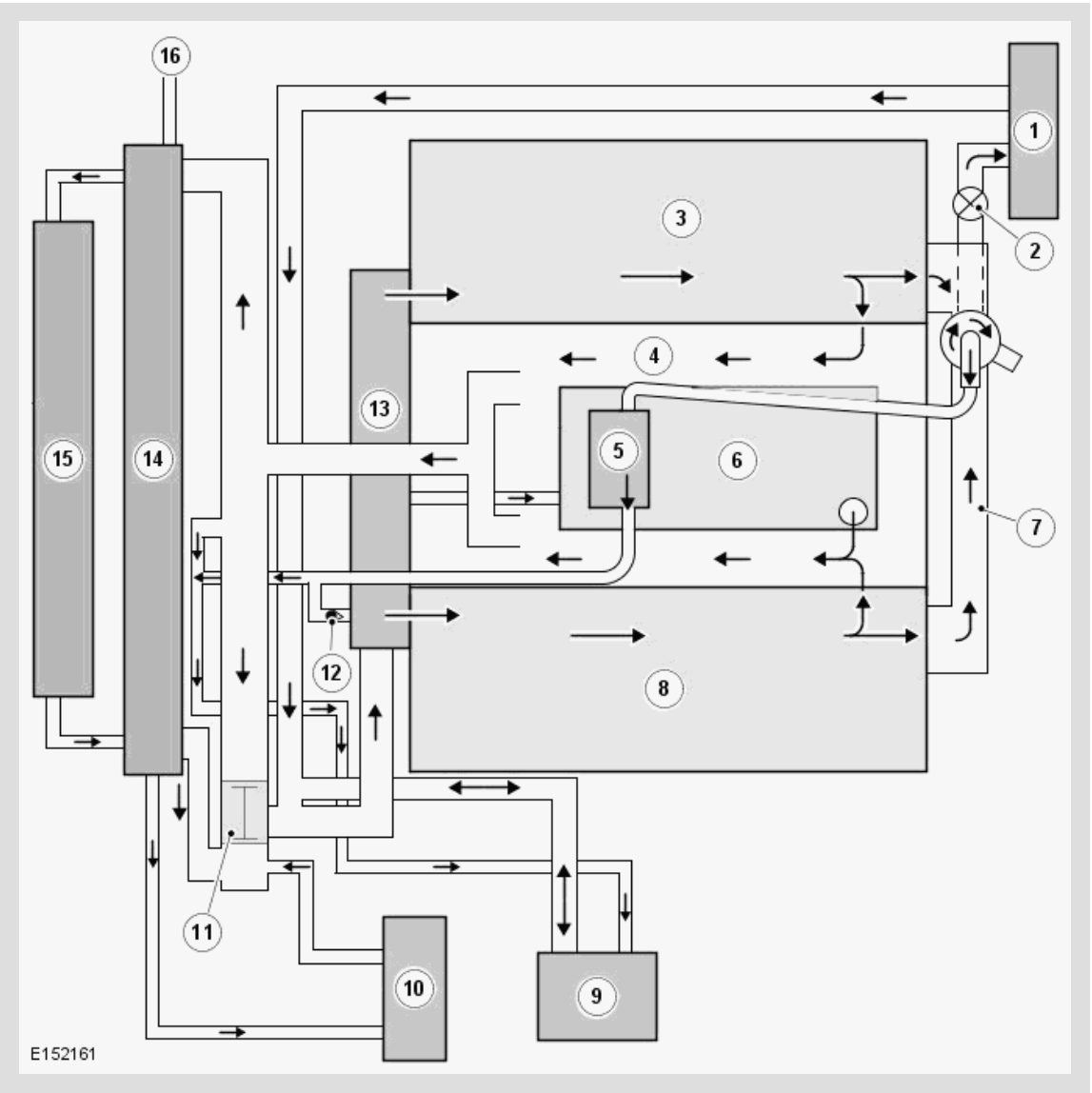


ITEM	DESCRIPTION
1	Heater core
2	Air bleed screw
3	Right cylinder head
4	Cylinder block
5	Throttle housing
6	Engine oil cooler
7	Heater manifold

cardiagn.com

8	Left cylinder head
9	Expansion tank
10	Automatic Transmission Fluid (ATF) cooler
11	Thermostat
12	Check valve
13	Coolant pump
14	Radiator
15	Connection with supercharger cooling system

Engine Cooling Flow Diagram - Hot Climate Markets



ITEM	DESCRIPTION

cardiagn.com

1	Heater core
2	Air bleed screw
3	Right cylinder head
4	Cylinder block
5	Throttle housing
6	Engine oil cooler
7	Heater manifold
8	Left cylinder head
9	Expansion tank
10	Automatic Transmission Fluid (ATF) cooler
11	Thermostat
12	Check valve
13	Coolant pump
14	Radiator
15	Auxiliary radiator
16	Connection with supercharger cooling system

When the engine is running, the coolant is circulated around the engine cooling system by the coolant pump. From the coolant pump, coolant flows through the cylinder heads and the engine oil cooler into the cylinder block and the heater manifold.

In the cylinder block, the coolant flows forwards to the outlet tube. When the coolant is cold the thermostat is closed, coolant flows direct from the outlet tube back to the coolant pump. Once the coolant reaches operating temperature, the thermostat begins to open to control the system temperature, coolant flows from the outlet tube to the coolant pump via the radiator and, where fitted, the auxiliary radiator. When the thermostat is open, the coolant flow through the radiator(s) also generates a coolant flow through the transmission fluid cooler.

cardiagn.com

From the heater manifold the coolant flows through the electronic throttle and the heater core, in parallel circuits that are unaffected by the position of the thermostat. From the electronic throttle, the coolant merges with bleed coolant from the coolant pump and the outlet tube and flows to the expansion tank. From the heater core, the coolant flows back to the inlet of the coolant pump.

Expansion and contraction of the coolant is accommodated by an air space in the expansion tank and the compliance of the flexible hoses.

If the coolant level in the expansion tank decreases below a predetermined value, the level sensor connects a ground to the instrument cluster, which activates the appropriate warning.
For additional information, refer to: Instrument Cluster (413-01 Instrument Cluster, Description and Operation).

The cooling fan is operated by a fan control module integrated into the cooling fan motor. The fan control module regulates the voltage, and thus speed, of the cooling fan motor in response to a PWM signal from the ECM . The cooling fan motor also provides a diagnostic feedback to the ECM via the PWM connection.

The electric cooling fan receives a battery feed and an ignition feed from the EJB (engine junction box) . The ignition feed is supplied from the ignition relay in the EJB , which is controlled by the ECM .

The ECM calculates the required fan speed from the engine temperature, A/C (air conditioning) system pressure and automatic transmission fluid temperature. Under hot operating conditions, the fan may continue to operate for 4 minutes after the engine has been switched off.

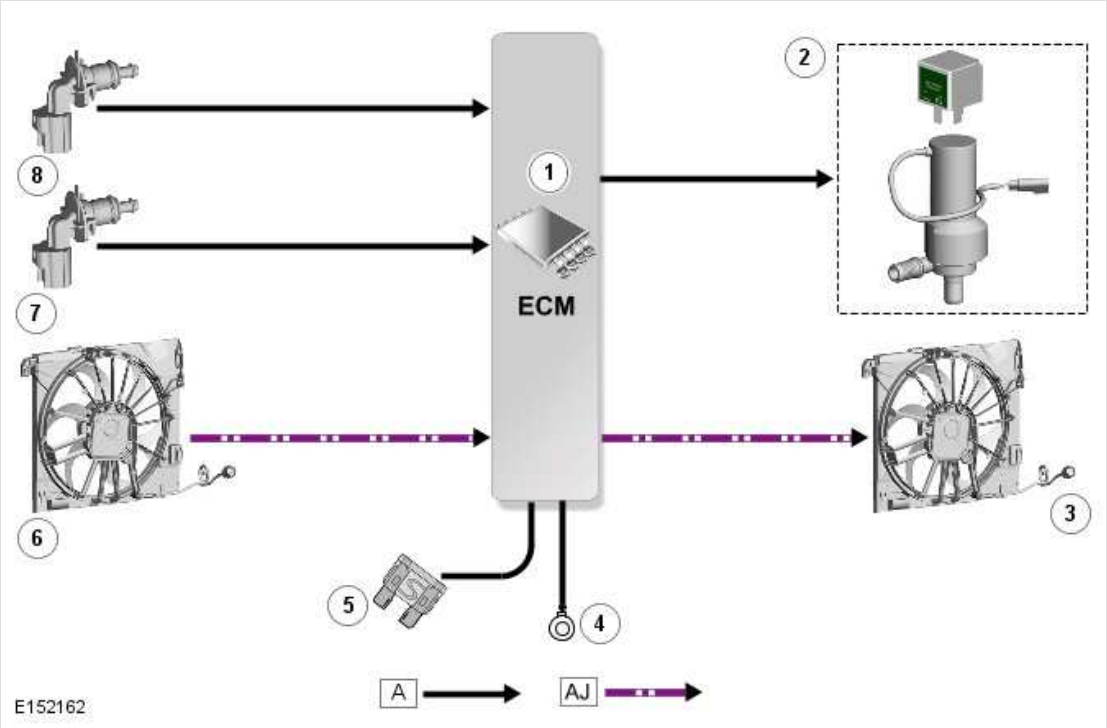
The supercharger cooling system also uses the engine cooling system for charge air cooling.
For additional information, refer to: Supercharger Cooling (303-03B, Description and Operation).

cardiagn.com

CONTROL DIAGRAM

NOTE:

A = Hardwired; **AL** = Pulse Width Modulation (PWM)



ITEM	DESCRIPTION
1	Engine Control Module (ECM)
2	Charge air coolant pump
3	Electric cooling fan
4	Ground
5	Power supply
6	Electric cooling fan
7	Engine Coolant Temperature (ECT) sensor 1
8	ECT sensor 2

cardiagn.com

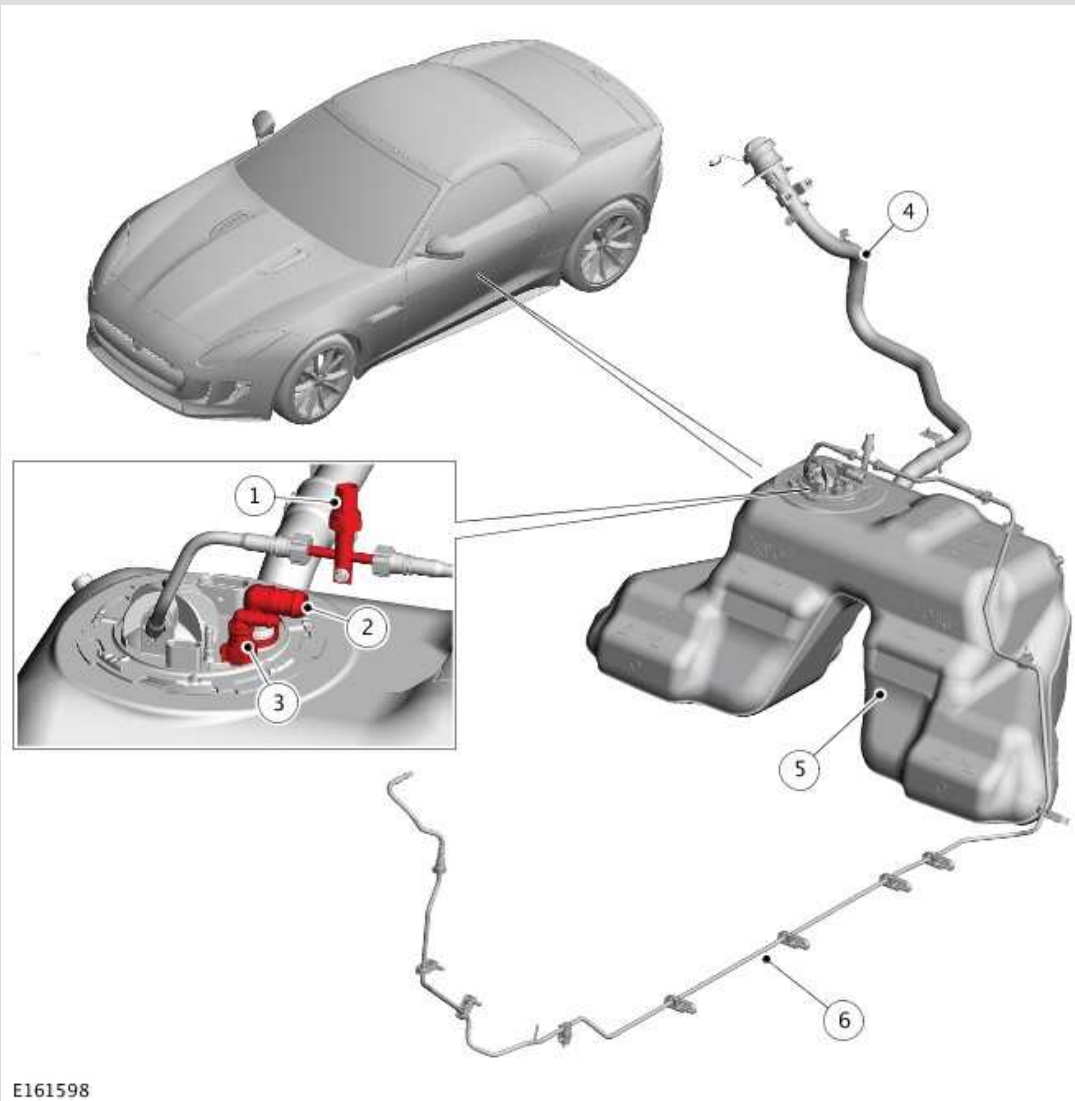
2015.0 F-TYPE (X152), 310-01

FUEL TANK AND LINES - V6 S/C 3.0L PETROL

DESCRIPTION AND OPERATION

COMPONENT LOCATION

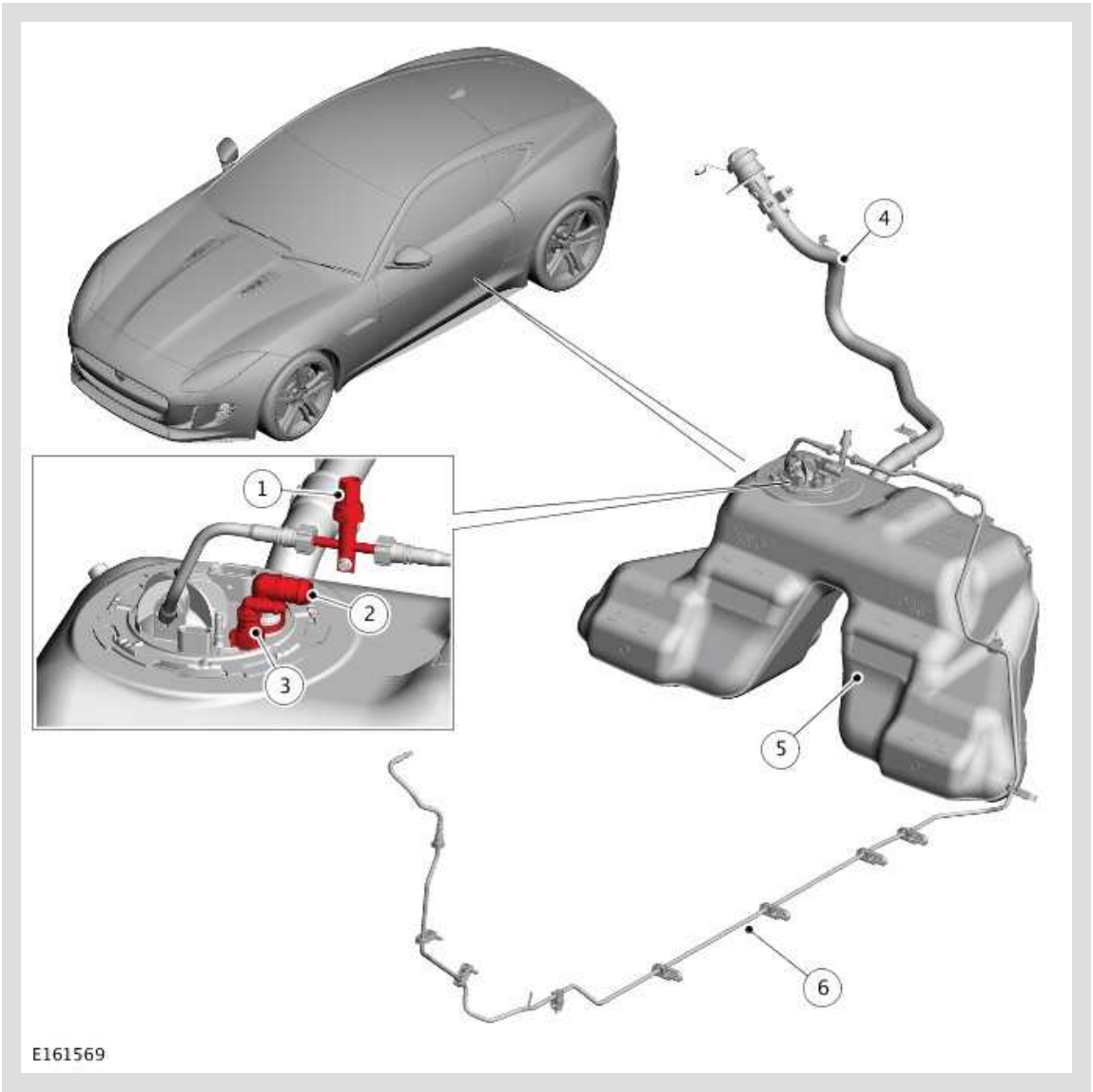
V6 3.0L SC Petrol - Fuel Tank And Lines - All Except NAS Vehicles - CONVERTIBLE



cardiagn.com

ITEM	DESCRIPTION
1	Low Pressure (LP) Fuel Sensor
2	Fuel Tank Refueling Breather Connection
3	Fuel Tank Ventilation Pipe Connection
4	Fuel Filler Pipe
5	Fuel Tank
6	Fuel Delivery Line

V6 3.0L SC Petrol - Fuel Tank And Lines - All Except NAS Vehicles - COUPE

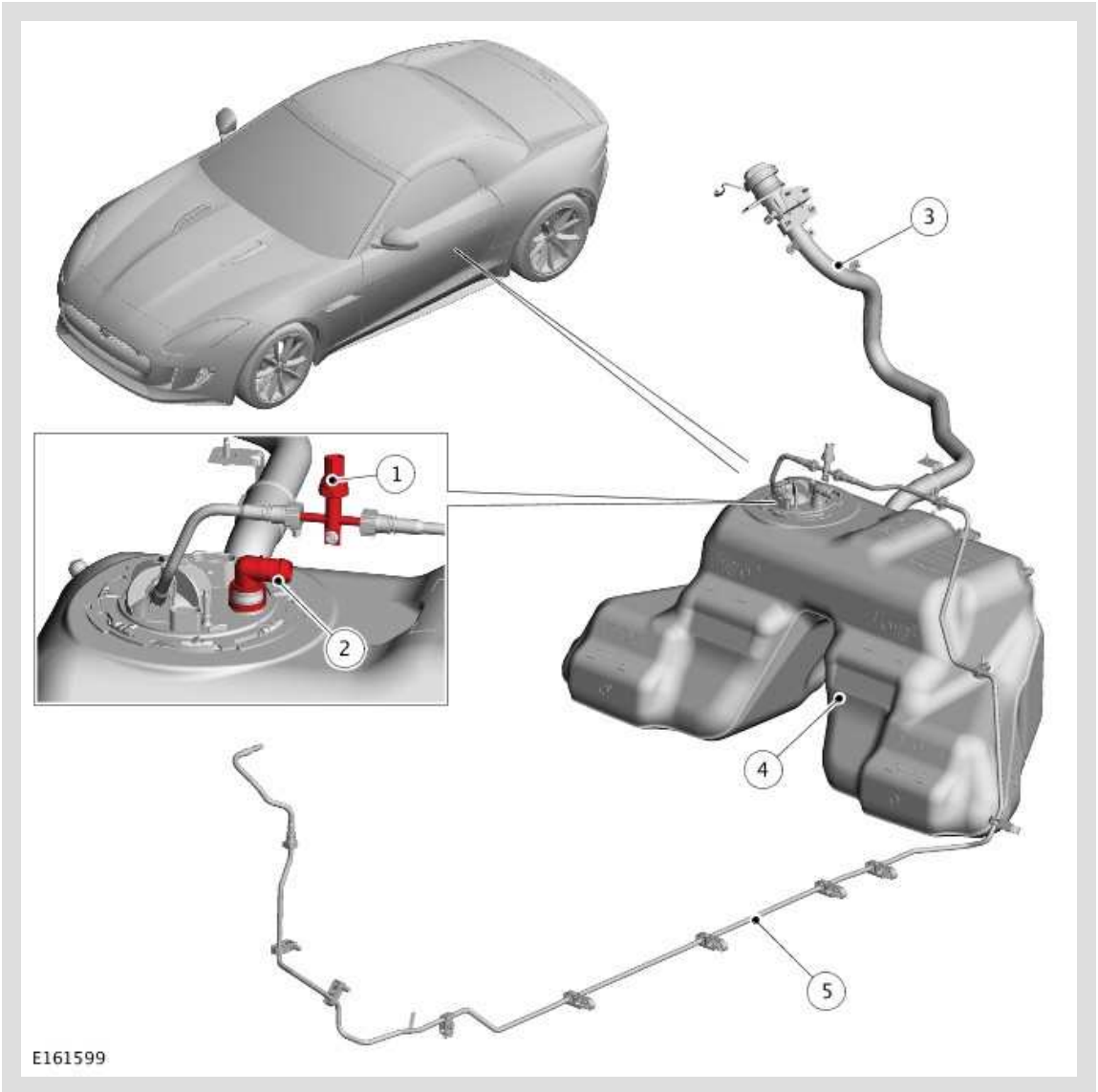


ITEM	DESCRIPTION

cardiagn.com

1	Low Pressure (LP) Fuel Sensor
2	Fuel Tank Refueling Breather Connection
3	Fuel Tank Ventilation Pipe Connection
4	Fuel Filler Pipe
5	Fuel Tank
6	Fuel Delivery Line

V6 3.0L SC Petrol - Fuel Tank and Lines - NAS Vehicles Only - CONVERTIBLE

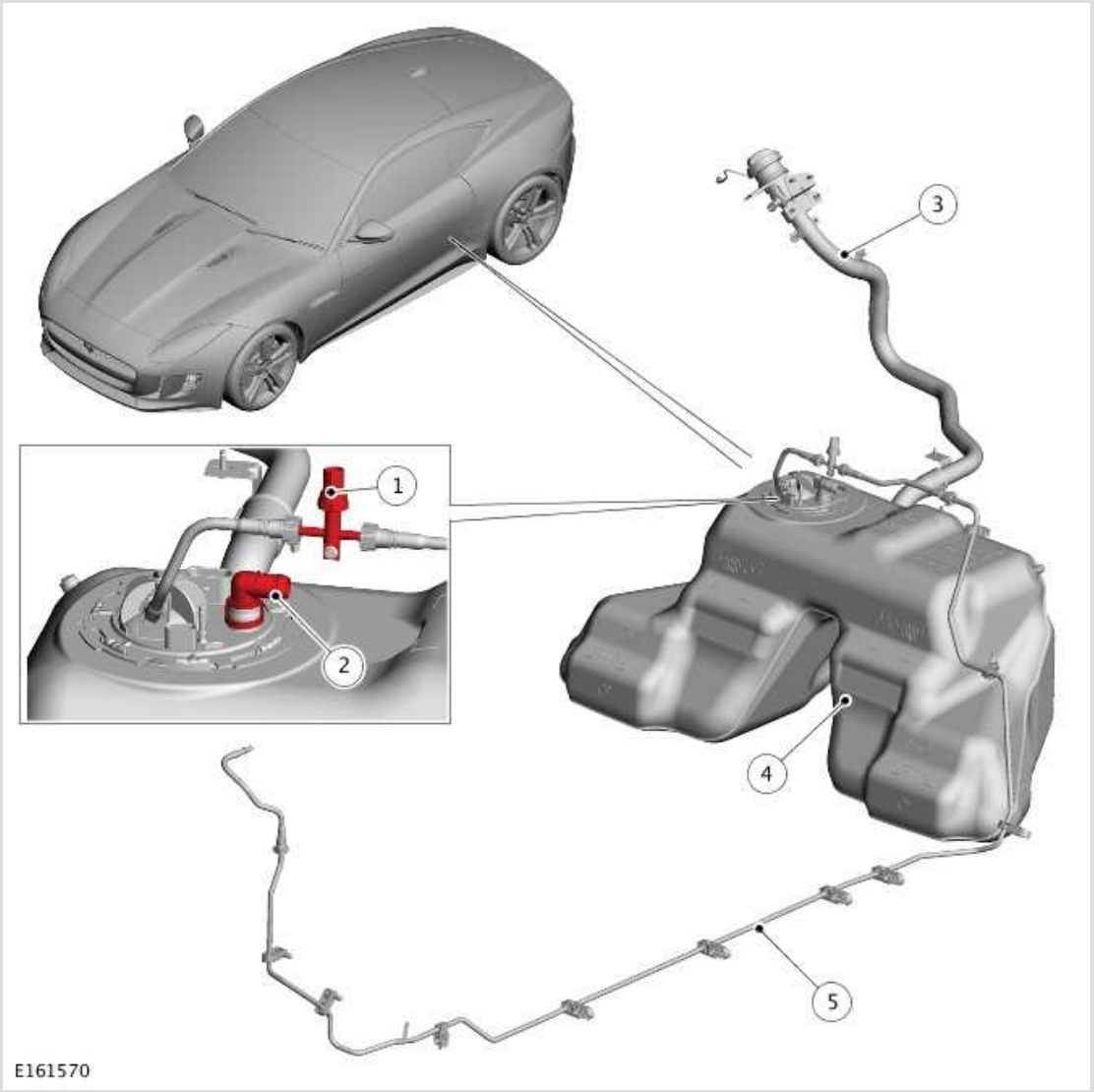


ITEM	DESCRIPTION
1	Low Pressure (LP) Fuel Sensor

cardiagn.com

2	Fuel Tank Refueling Breather Connection
3	Fuel Filler Pipe
4	Fuel Tank
5	Fuel Delivery Line

V6 3.0L SC Petrol - Fuel Tank and Lines - NAS Vehicles Only - COUPE



ITEM	DESCRIPTION
1	Low Pressure (LP) Fuel Sensor
2	Fuel Tank Refueling Breather Connection
3	Fuel Filler Pipe
4	Fuel Tank

cardiagn.com

5	Fuel Delivery Line

OVERVIEW

The V6 3.0L SC (Supercharged) low pressure (LP) fuel system is designed to deliver fuel to the high pressure fuel pumps, mounted on the engine.

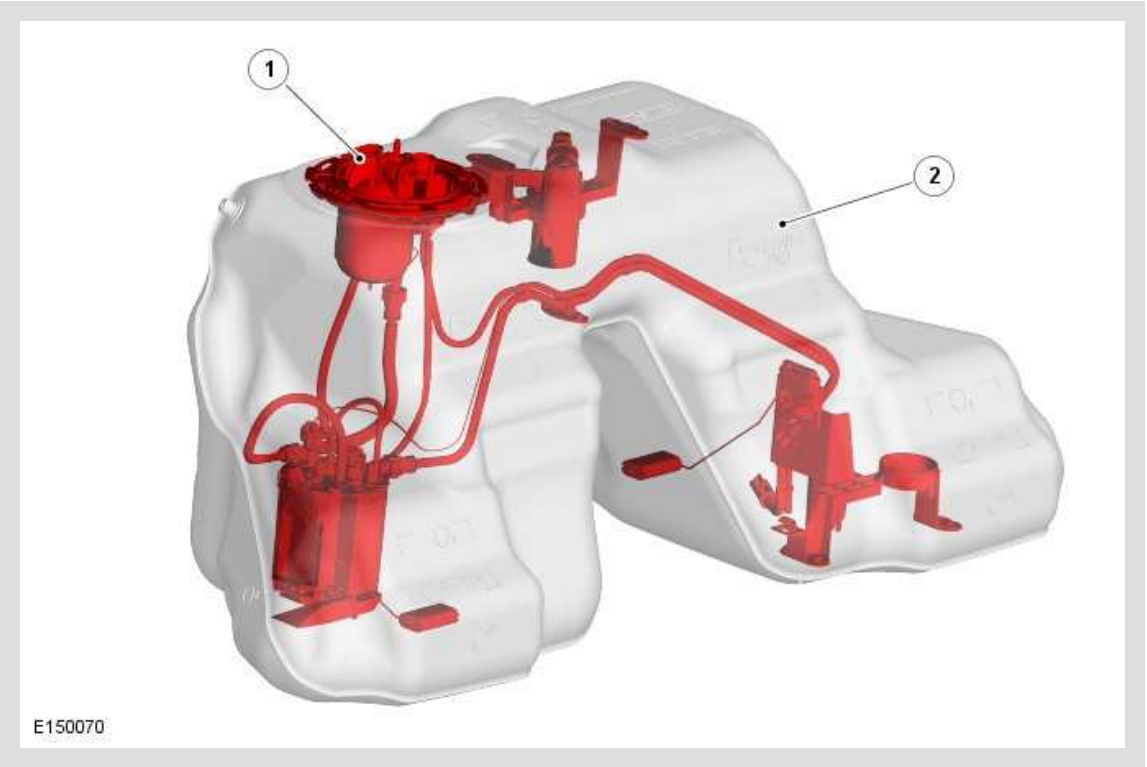
The fuel system uses an electronically controlled return less fuel system; this will allow the low pressure pump to deliver fuel to the high pressure pumps, dependant on engine demand. The low pressure pump's pressure and flow is varied by the Engine Control Module (ECM), with increased system pressure up to 7.3 bar (105.9 Ibf/in.2) absolute at high temperature and matches the flow in support of engine fueling requirements.

The V6 3.0L SC (Supercharged) fuel pump operation is regulated by a Fuel Pump Driver Module (FPDM) which is controlled by the engine management system. The driver module regulates the flow and pressure supplied by controlling the operation of the fuel pump using a Pulse Width Modulation (PWM) output.

COMPONENT DESCRIPTION

FUEL TANK

cardiagn.com



ITEM	DESCRIPTION
1	Fuel Pump Module
2	Fuel Tank

The fuel tank has a capacity of 72 liters (19 US Gallons).

Inside the fuel tank, you will find the location of the low pressure fuel pump module.

cardiagn.com

Access to the fuel pump module is via the removal of the fuel tank and removal of the fuel pump module locking flange located on the right side of the tank.

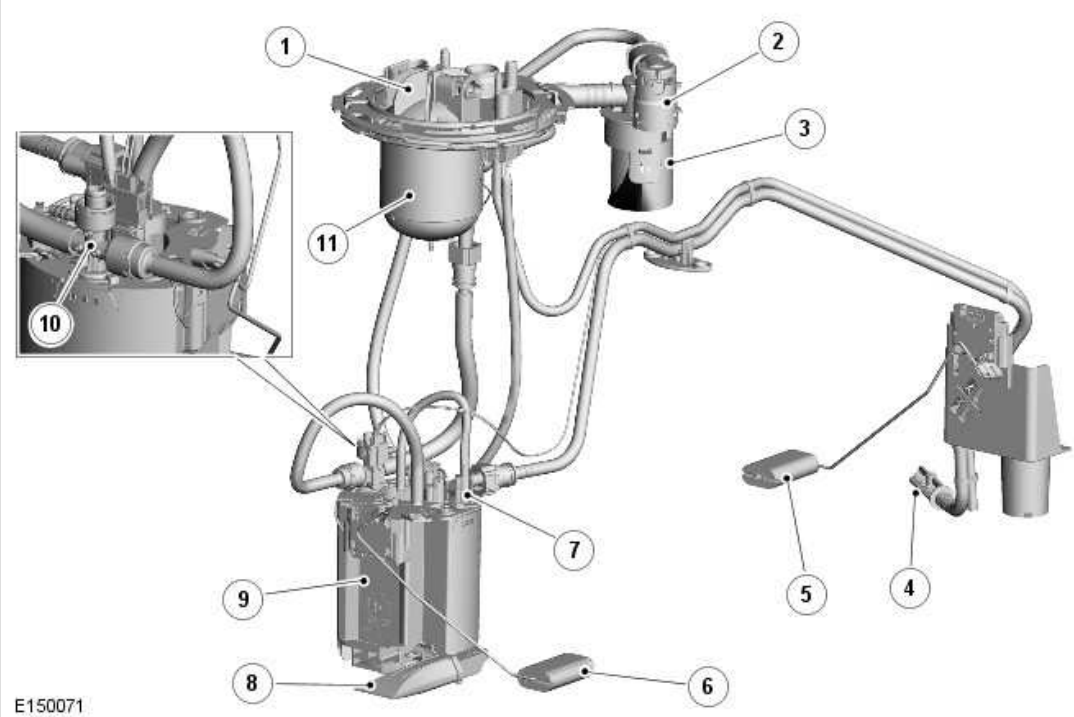
Within the fuel tank, in the upper left center section, a Fuel Limit Vent Valve (FLVV) is positioned. This is to control the fuel fill volume into the tank.

Also within the fuel tank is a roll over valve (ROV) in the upper center section.

On **NAS vehicles** a combined ROV and FLVV is used.

Fuel level inside the tank is monitored by two level sensors.

FUEL PUMP MODULE



ITEM	DESCRIPTION
1	Fuel Pump Module Flange
2	Roll Over Valve (ROV)
3	Fuel Limit Vent Valve (FLVV)
4	Suction Port Filter

cardiagn.com

5	Passive Side Fuel Level Sensor Float
6	Active Side Fuel Level Sensor Float
7	Jet Pump
8	Fuel Pump Coarse Filter
9	Swirl Pot
10	Pressure Relief Valve (PRV)
11	Intank Fuel Filter

Low Pressure (LP) Fuel Pump

The low pressure (LP) fuel pump is controlled by the FPDM via the fuel pump relay located in the Central Junction Box (CJB).

The LP pump collects fuel from the swirl pot and passes it from the tank to the fuel delivery line via the intank fuel filter, to the engine mounted, high pressure (HP) pump at a pressure of 5.5 to 7.3 bar (79.9 to 105.9 Ibf/in.2).

Should the fuel pump electrical connection need to be disconnected, it is important that the ignition is switched off. If the ignition is in position I or II, the instrument cluster will store its last fuel gauge needle position prior to power down. Once power is restored the gauge will display the last stored position regardless of the actual level in the tank.

This could result in incorrect fuel gauge readings if the fuel tank has been drained and not filled with exactly the same quantity of fuel that was removed.

Jet Pump

Fuel is collected from the left side of the tank to the right side of the tank by using a single suction tube that transfers fuel using a jet pump which is powered by the fuel feed from the LP fuel pump.

Fuel Limit Vent Valve (FLVV)

cardiagn.com

Fuel Limit Vent Valve (FLVV) controls the fuel fill volume into the tank. During the refueling process, air and vapor is displaced (by the fuel entering the tank) and exits the tank via the Fuel Limit Vent Valve (FLVV) and is conveyed by the fuel tank refueling breather pipe to exit the system either by the filler head for the **EURO or ROW vehicles** and via the charcoal canister for **NAS vehicles** . During filling, as the tank reaches its full level, the float in the FLVV is closed by the rising fuel and prevents air and vapor passing through to the refueling breather pipe. The resulting back pressure causes refueling to stop automatically.

Roll Over Valve (ROV)

Roll Over Valve allows vapor to escape to prevent tank pressurization in normal vehicle operating modes; however this valve is designed to close to prevent fuel leakage through the vent in the event of a vehicle roll over.

Pressure Relief Valve (PRV)

The pressure relief valve is installed in the pipe between the LP fuel pump and the fuel pump module flange to protect the system from excess pressure. The pressure relief valve releases fuel back into the tank if pressure in the pipe increases from 7.3 to 8.3 bar (105.9 to 120.4 lbf/in.2).

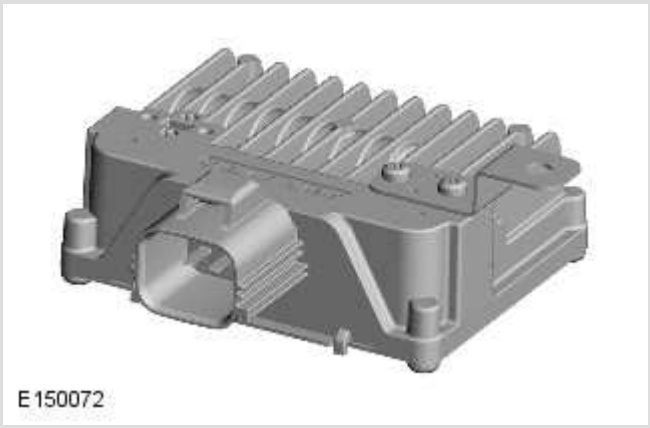
Fuel Level Sensors

There are two fuel level sensors located inside the fuel tank. One sensor is attached to the swirl pot and monitors fuel level on the right side of the tank. The second is attached on the suction pipe carrier and monitors fuel level on the left side of the tank.

Both level sensors are MAgnetic Passive Position Sensors (MAPPS) which provide a variable resistance to ground for the output from the fuel gauge.

FUEL PUMP DRIVER MODULE

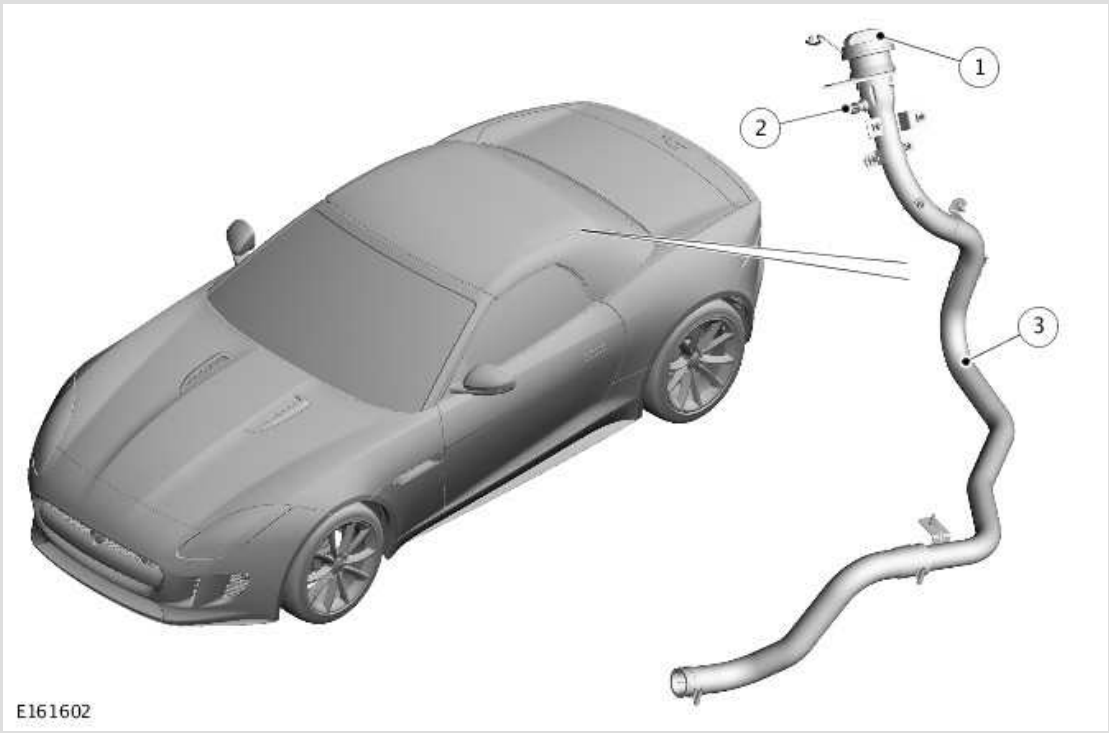
cardiagn.com



The FPDM controls the speed of the fuel pump to match the fuel demand of the engine.

The pump speed required is calculated by the ECM and transmitted to the FPDM in a PWM.

FUEL FILLER PIPE - CONVERTIBLE

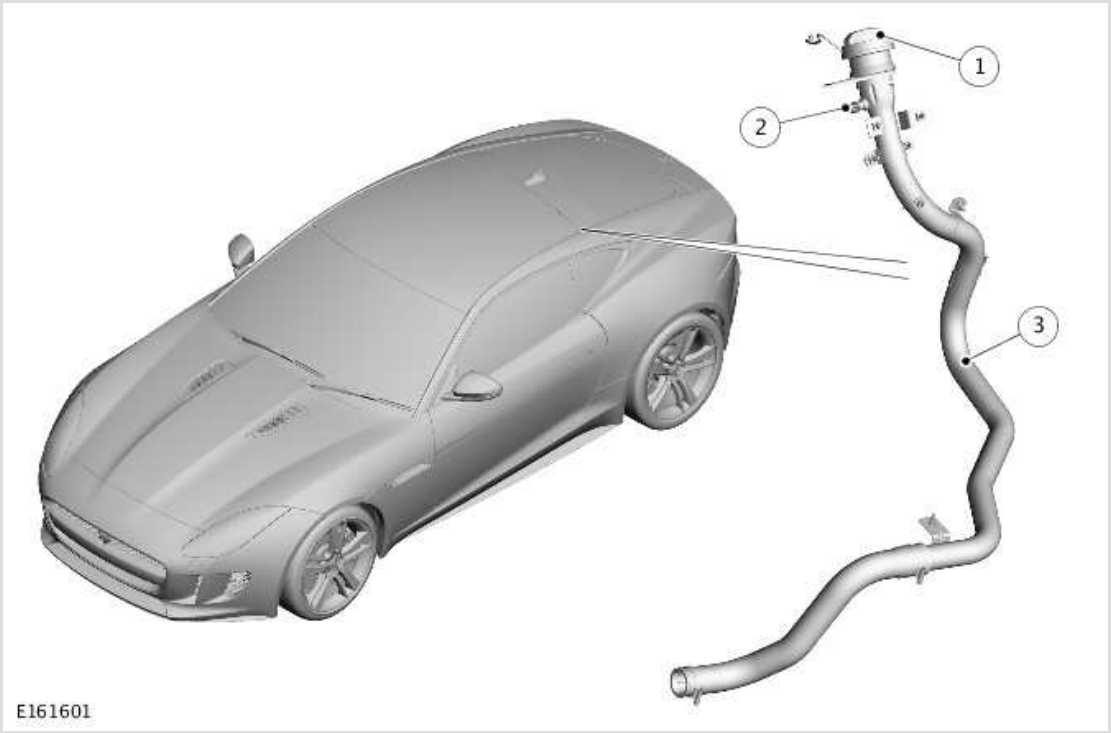


ITEM	DESCRIPTION
1	Fuel Filler Cap
2	Fuel Filler Pipe

cardiagn.com

3	Refueling Breather Pipe Connection

Fuel Filler Pipe - Coupe



ITEM	DESCRIPTION
1	Fuel Filler Cap
2	Fuel Filler Pipe
3	Refueling Breather Pipe Connection

The fuel filler pipe locates into the tank and incorporates a spit back flap in the tank end of the pipe. The flap is spring loaded cover which acts as one way valve, allowing the tank to be filled but preventing fuel leaving the tank into the filler pipe.

A connection at the top right side of the filler head allows for the connection of the fuel tank breather pipe which goes to the tank. On **NAS vehicles only** , this connection will only be used for EVAP, as the refueling breather is routed to the charcoal canister.

cardiagn.com

For additional information, refer to: Evaporative Emissions (303-13B Evaporative Emissions - V8 S/C 5.0L Petrol, Description and Operation).

FUEL LOW PRESSURE SENSOR

The fuel low pressure sensor supplies a pressure signal to the ECM to enable closed loop control of the fuel pump.

For additional information, refer to: Electronic Engine Controls (303-14A Electronic Engine Controls - V6 S/C 3.0L Petrol, Description and Operation).

SYSTEM OPERATION

FUEL PUMP DRIVER MODULE

The FPDM is powered by a supply from the fuel pump relay in CJB. The fuel pump relay is energized on opening the driver's door or when power mode engine crank is initiated using the stop/start switch. The FPDM supplies power to the fuel pump, and adjusts the power to control the speed of the fuel pump and thus the pressure and flow in the delivery line.

A PWM signal from the ECM tells the FPDM the required speed for the fuel pump. The on time of the PWM signal represents half the pump speed, e.g. if the PWM signal with an on time of 50%, the FPDM drives the pump at 100%.

cardiagn.com

The FPDM will only energize the fuel pump if it receives a valid PWM signal, with an on time of between 4% and 50%. To switch the fuel pump off, the ECM transmits a PWM signal with an on time of 75%.

The output pressure from the fuel pump will change with changes of engine demand and fuel temperature. The ECM monitors the input from the LP fuel sensor and adjusts the speed of the fuel pump as necessary to maintain an ECM requested output pressure of 5.5 bar to 7.3 bar (79.9 to 105.9 Ibf/in.2) absolute, during engine start up and engine shut down. Target pressure for the LP fuel delivery line is raised to 7.3 bar (79.9 Ibf/in.2).

If the Supplemental Restraint System (SRS) outputs a crash signal to the ECM, the ECM will de-energize the fuel pump relay to prevent any further fuel being pumped to the engine.

If the ECM does not detect pressure in the fuel delivery line, it stops, or refuses to start the engine and stores the appropriate Diagnostic Trouble Code (DTC).

The ECM receives a monitoring signal from the FPDM. Any DTC produced by the FPDM are stored by the ECM.

DTC can be retrieved from the ECM using an approved Jaguar diagnostic system. The FPDM itself cannot be interrogated by the approved Jaguar diagnostic system.

FUEL LEVEL SENSORS

The fuel level sensors electrical output signal is proportional to the amount of fuel in the tank and the position of the float arm. The measured resistance is processed by CJB and is sent to the instrument cluster via the Medium Speed (MS) Controller Area Network (CAN) to implement an anti-slosh function. This monitors the signal and updates the pointer position at regular intervals, preventing constant pointer movement caused by fuel movement in the tank due to cornering and braking.

cardiagn.com

When the fuel level becomes low, a fuel warning lamp in the instrument cluster is illuminated and a message is displayed. When the fuel level becomes too low, the instrument cluster sends a message to the ECM via the gateway Module to the High Speed (HS) CAN so that the low fuel strategy can be implemented.

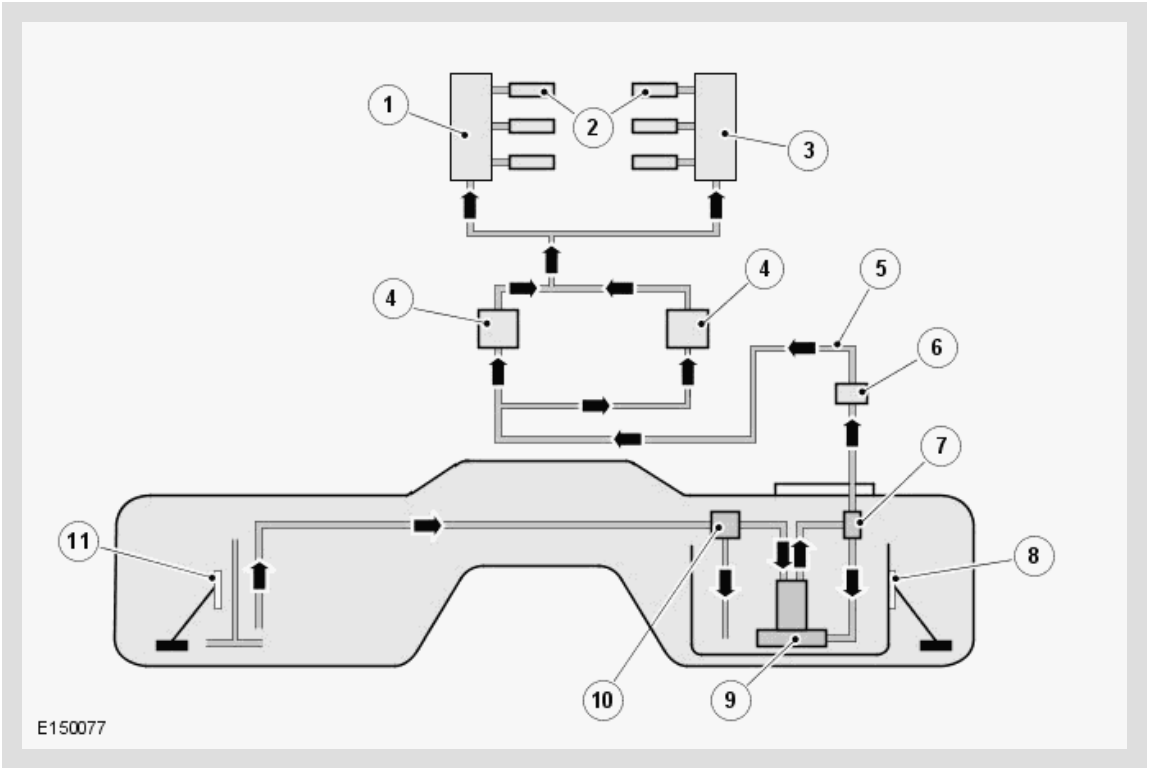
LOW FUEL STRATEGY

The ECM is programmed with a strategy which shuts the engine off before the fuel tank runs dry. This is to prevent fuel system damage by air being drawn into the high pressure fuel pump.

A misfire is induced with increasing magnitude when the fuel in the tank reaches approximately 2.5 liters of useable fuel remaining to alert the driver to this condition. The engine is shut down when the fuel in the tank reaches 0.00 liters of useable fuel remaining in the tank and 4.0 liters of un-useable fuel remaining.

To reset the fuel strategy after engine shutdown, it is required that a minimum of 4 liters of fuel is added to the fuel tank, when the vehicle is on level ground.

Fuel System Flow Schematic



cardiagn.com

ITEM	DESCRIPTION
1	Left Side High Pressure (HP) Fuel Rail
2	Fuel Injector (6 Off)
3	Right Side High Pressure Fuel Rail
4	High Pressure Fuel Pump (2 Off)
5	Fuel Delivery Line
6	Low Pressure (LP) Fuel Sensor
7	Pressure Relief Valve (PRV)
8	Active Side Fuel Level Sensor
9	Low Pressure (LP) Fuel Pump
10	Jet Pump
11	Passive Side Fuel Level Sensor

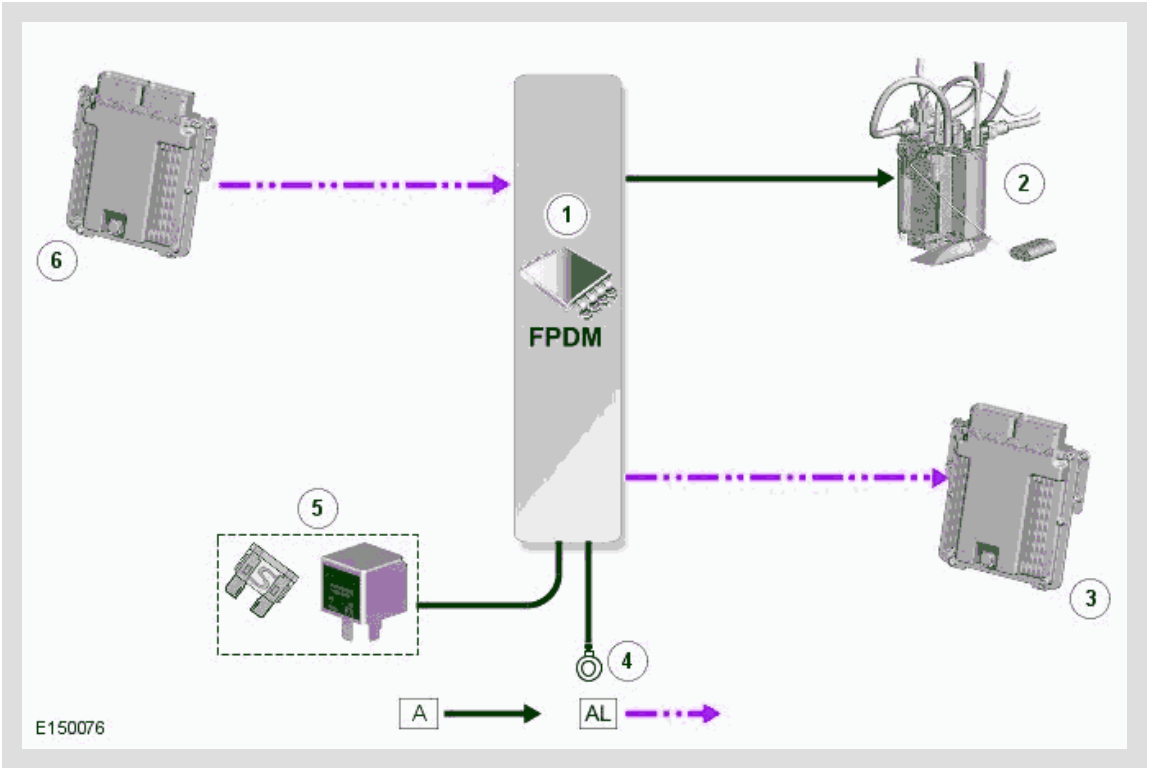
INPUT AND OUTPUT CONTROL DIAGRAM

Operation 1 of 2

NOTE:

A = Hardwired ; **AL** = PWM (Pulse Width Modulation)

cardiagn.com



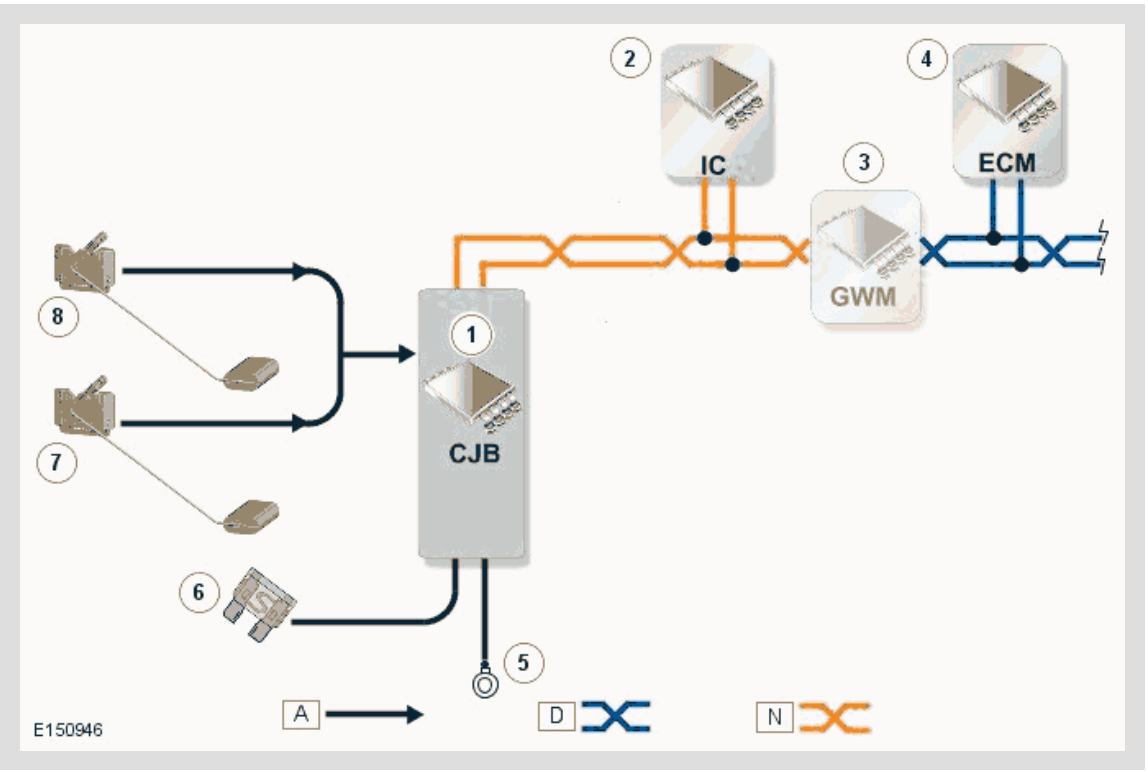
ITEM	DESCRIPTION
1	Fuel Pump Driver Module (FPDM)
2	Low Pressure Fuel Pump
3	Engine Control Module (ECM)
4	Ground
5	Power Supply
6	Engine Control Module

cardiagn.com

Operation 2 of 2

NOTE:

A = Hardwired ; **D** = High Speed CAN ; **N** = Mid Speed CAN



ITEM	DESCRIPTION
1	Central Junction Box (CJB)
2	Instrument Cluster (IC)
3	Gateway Module (GWM)
4	Engine Control Module (ECM)
5	Ground
6	Power Supply
7	Passive Side Fuel Level Sensor
8	Active Side Fuel Level Sensor

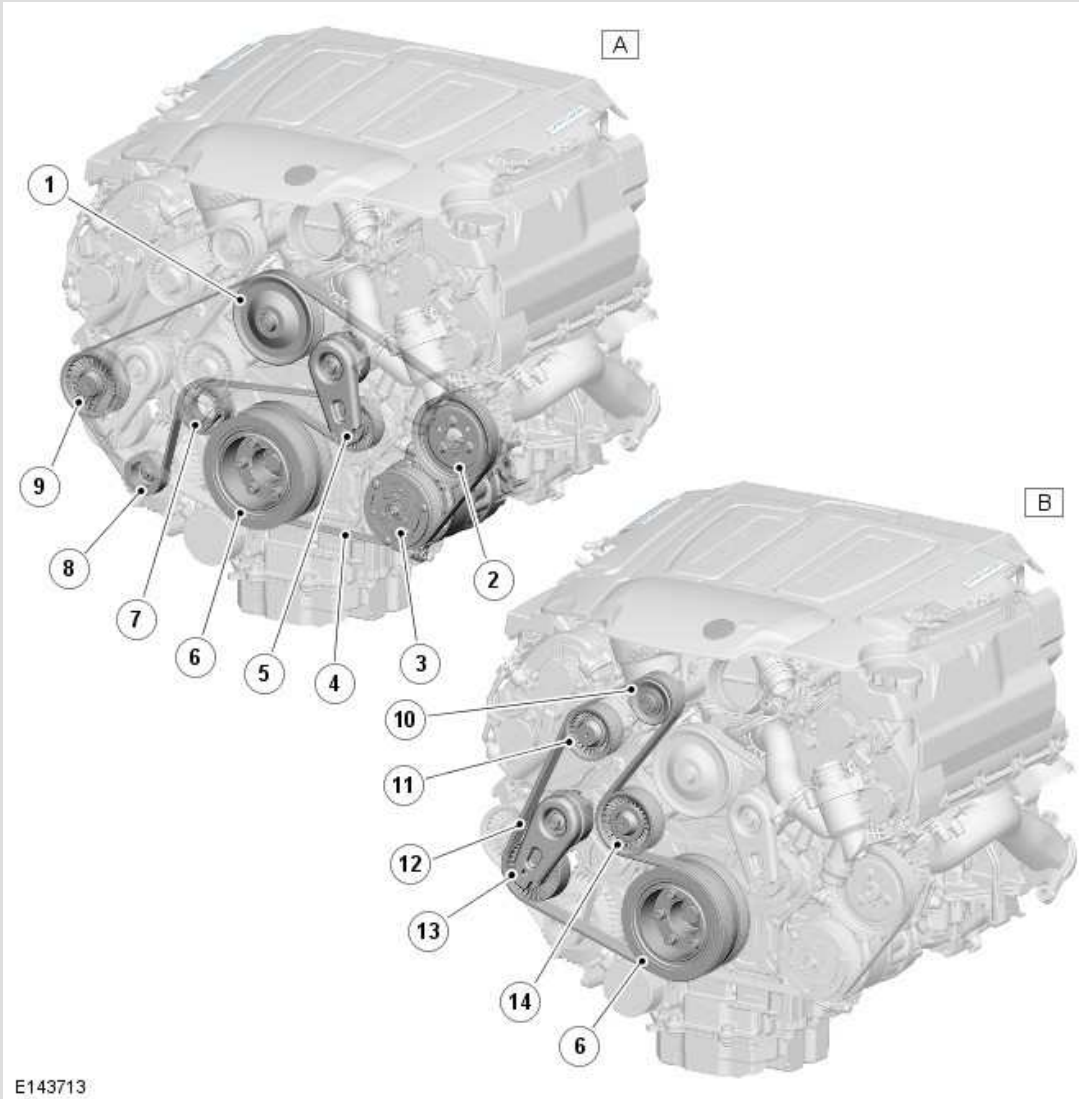
cardiagn.com

2015.0 F-TYPE (X152), 303-05

ACCESSORY DRIVE - V6 S/C 3.0L PETROL

DESCRIPTION AND OPERATION

COMPONENT LOCATION



ITEM	DESCRIPTION

cardiagn.com

A	Primary accessory drive
B	Secondary accessory drive
1	Coolant pump
2	Power steering pump
3	Air Conditioning (A/C) compressor
4	Primary drive belt
5	Belt tensioner
6	Crankshaft pulley/vibration damper assembly
7	Idler pulley
8	Generator
9	Idler pulley
10	Supercharger drive pulley
11	Idler pulley
12	Secondary drive belt
13	Belt tensioner
14	Idler pulley

OVERVIEW

The accessory drive is a belt system powered by a pulley attached to the front of the crankshaft. The crankshaft pulley, which incorporates a vibration damper assembly, drives two drive belts; a primary drive belt and a secondary drive belt. An automatic belt tensioner in each belt run maintains the drive belt at the correct tension. Together with idler pulleys, the belt tensioners also guide the drive belts clear of obstructions and set the correct 'wrap-around' of the accessory component drive pulleys to ensure a slip-free drive.

DESCRIPTION

PRIMARY DRIVE BELT

cardiagn.com

The primary drive belt is a six-ribbed poly-V belt that drives the:

- Coolant pump
- Power steering pump
- Air Conditioning (A/C) compressor
- Generator.

SECONDARY DRIVE BELT

The secondary drive belt is an eight-ribbed poly-V belt that drives the supercharger.

BELT TENSIONERS

Each belt tensioner consists of an idler pulley on the end of a spring loaded pivot arm. The pivot arms can be turned manually for removal and installation of the drive belts.

Each belt tensioner is calibrated to automatically maintain the correct tension in the related drive belt.

cardiagn.com

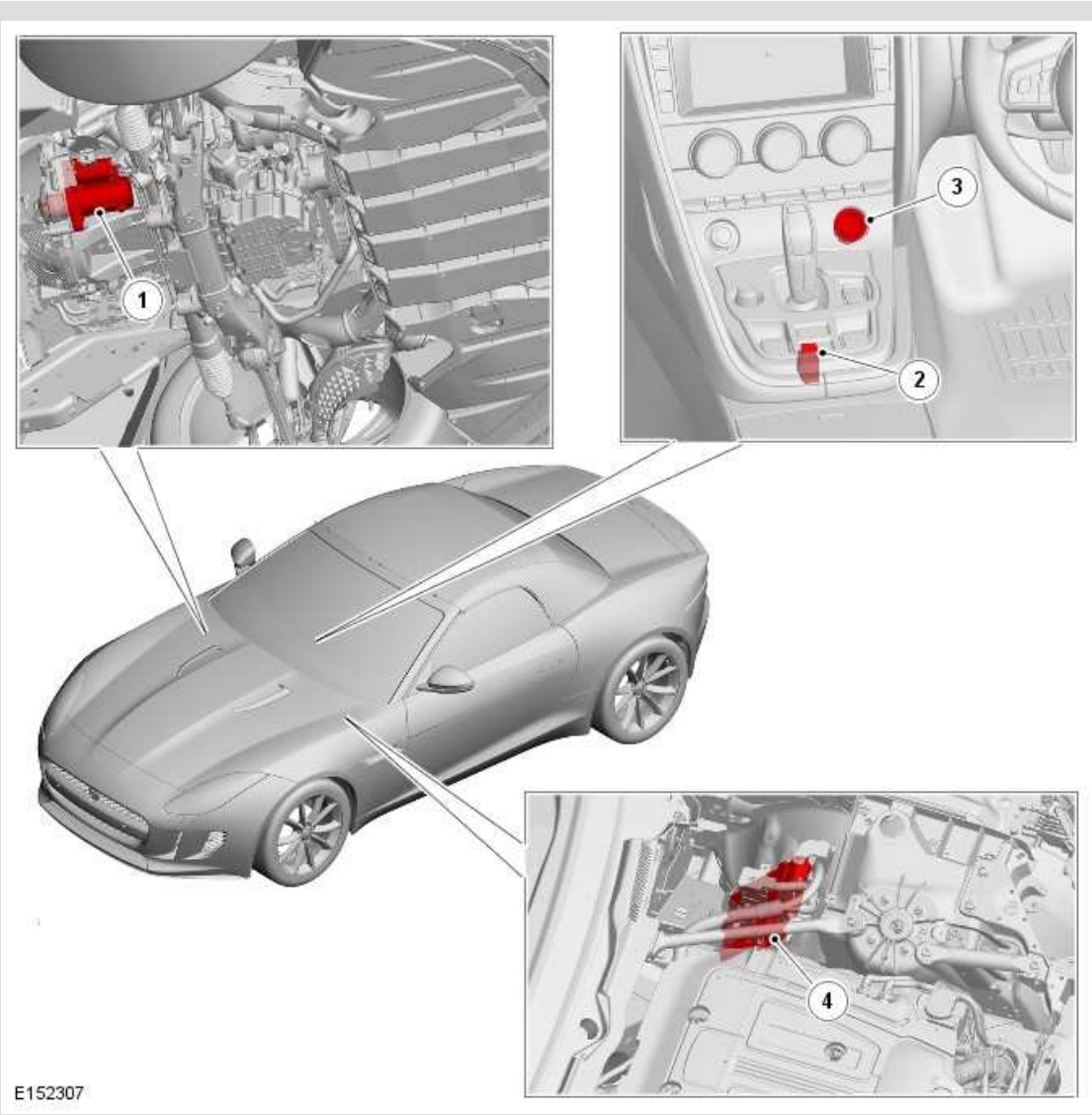
STARTING SYSTEM - V6 S/C 3.0L PETROL

DESCRIPTION AND OPERATION

COMPONENT LOCATION

NOTE:

Convertible shown, coupe is similar.



ITEM	DESCRIPTION
1	Starter motor (Tandem Solenoid Starter (TSS) motor, where available)
2	ECO / Deployable Spoiler Switchpack
3	Stop/start switch
4	Engine Control Module (ECM)

OVERVIEW

VEHICLES WITHOUT STOP/START SYSTEM

The starter motor is manufactured by Denso and is rated at 1.8 kW. The motor is geared directly to the pinion. The motor is a series

cardiagn.com

wound motor with an overrunning clutch. The interior of the motor is ventilated through a breather tube attached to the underside of the motor housing.

VEHICLES WITH STOP/START SYSTEM

The V6 3.0L S/C Petrol engine features Intelligent Stop/Start technology in some markets. The stop/start system automatically stops and re-starts the engine when appropriate conditions are met. This reduces the amount of time the engine is running at idle speed which improves economy and reduces engine emissions. This provides advantages for vehicles which spend time in congested environments, for example waiting at traffic lights or frequent stopping and starting in traffic queues.

The advantages of the intelligent Stop/Start system are:

- Carbon Dioxide (CO2) emissions significantly reduced
- Fuel consumption improved.

> **NOTE:**
>
> Fuel economy and emissions reduction will vary depending on driving style and traffic conditions.

Intelligent Stop/Start is a standard fitment on the V6 3.0L S/C Petrol engine in some markets. The system is automatically activated each time an ignition cycle occurs and is operational in DRIVE and SPORT transmission positions. The driver can disable the system by pressing the 'ECO' switch in the floor console.

The Intelligent Stop/Start system stops the engine when it is not needed, this is known as ECO stop. The engine will restart automatically when vehicle parameters are met and the driver removes their foot from the brake pedal, this is known as ECO start. The engine will be at full operating speed before the driver's foot reaches the accelerator pedal.

cardiagn.com

The Stop/Start system is fully integrated into the vehicle electrical systems and other system modules communicate to determine if an ECO stop or start is viable.

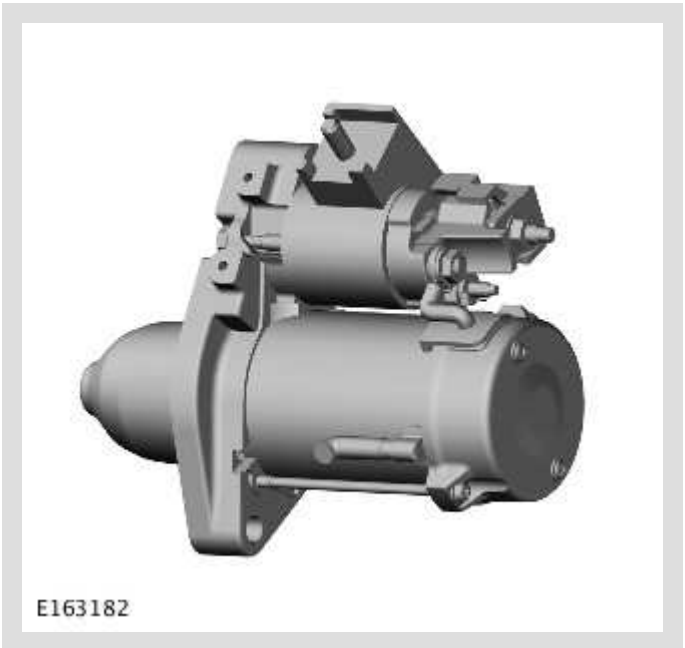
The Stop/Start system uses a unique type of starter motor; a Tandem Solenoid Starter (TSS) motor.

The TSS motor can restart the engine if it is still rotating, allowing the engine to be started quickly in any situation.

The stop/start system uses a dual battery system, to ensure sufficient battery power is available for repeated engine starts without affecting the operation of the vehicle systems.
For additional information, refer to: Battery and Cables (414-01 Battery, Mounting and Cables, Description and Operation).

DESCRIPTION

STARTER MOTOR



The starter motor is located on the rear left side of the cylinder block and protrudes through an aperture to drive the drive plate via a ring gear. The motor is secured to the cylinder block by 2 bolts. Power to

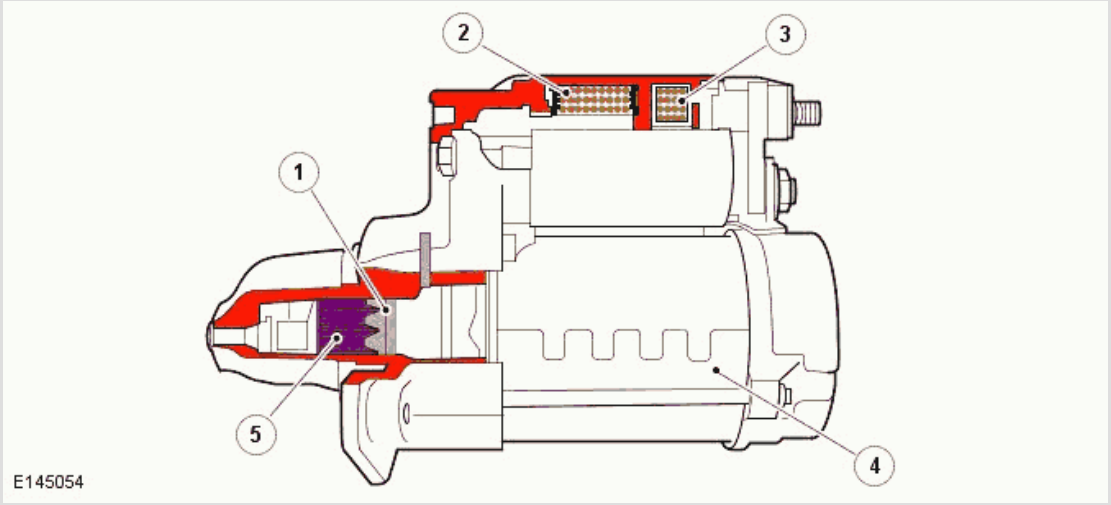
cardiagn.com

operate the motor is supplied from BJB (Battery Junction Box). Power to operate the solenoid is supplied from the starter relay in the EJB (Engine Junction Box).

TANDEM SOLENOID STARTER (TSS) MOTOR

The TSS motor is a unique starter motor specifically for stop/start systems. The TSS motor can control the forward movement of the pinion gear and the rotation of the motor separately, which allows for better synchronized engine restarts, when the engine is still rotating.

TSS Motor Sectional View



ITEM	DESCRIPTION
1	Advanced engagement mechanism
2	Pinion gear shift solenoid
3	Motor rotation solenoid

cardiagn.com

4	Motor/casing
5	Pinion gear

OPERATION

OPERATION - VEHICLES WITHOUT STOP/START SYSTEM

The starter solenoid is energized by the EJB on receipt of a signal from the ECM. When engine cranking is requested, the ECM checks that a valid smart key code has been received before granting the crank request.
For additional information, refer to: Anti-Theft - Passive (419-01B Anti-Theft - Passive, Description and Operation).

OPERATION - VEHICLES WITH STOP/START SYSTEM

If the engine is rotating fast, the TSS motor is energized by a solenoid to increase the pinion gear speed. The second solenoid is energized and the pinion gear is moved forward to engage with the ring gear when the rotational speed of the ring gear and pinion gear are within limits.

When the engine is rotating slowly enough for the two gears to be connected, the pinion gear is first moved forward into engagement with the ring gear, and then the TSS motor is powered to restart the engine.

With the TSS, the pinion gear movement and motor rotation are separately controlled by the ECM (Engine Control Module) via relays in the EJB depending on the engine speed, and the engine can restart while it is still rotating. This provides an instant engine restart.

The TSS motor is controlled by the ECM. The ECM controls two starter motor relays located in the EJB; one for the motor and one for the pinion movement.

A permanent battery supply from the primary battery is connected to the starter motor via a 400A fuse in the BJB.

cardiagn.com

When the ECM energizes the two relays in the EJB, battery power from the primary battery is supplied via a 350A fuse in the BJB and passes through fuses in the PSDB (Power Supply Distribution Box) to each starter motor relay in the EJB. The power passes through the relay contacts in the EJB to the TSS motor solenoids. The ECM controls the operation of each relay individually to control the TSS operation depending on engine operating conditions.

The PSDB contains two MOSFETs which are controlled by the GWM (Gateway Module) via the LIN (Local Interconnect Network) bus. The GWM monitors the vehicle electrical loads and will prevent the available electrical power to other vehicle systems being subjected to low voltages and use power from the secondary battery to ensure the other vehicle systems are unaffected by the vehicle restart. If the available battery voltage from either the primary and secondary batteries is too low, the GWM will inhibit the Stop/Start system.
For additional information, refer to: Battery and Cables (414-01 Battery, Mounting and Cables, Description and Operation).

INTELLIGENT STOP/START SYSTEM

The Intelligent Stop/Start system is controlled by the ECM, the Gateway Module (GWM) and the PSDB (Power Supply Distribution Box) using LIN (Local Interconnect Network) bus and HS (High Speed) CAN (Controller Area Network) bus messages and signals from other system components and modules to determine the correct conditions for system operation.

The Intelligent Stop/Start system detects when it is appropriate to stop and start the engine.

Before the engine is stopped the following parameters must be detected:

- The vehicle must be stopped from a speed greater than 4 km/h (2.5 mph)
- Sufficient brake pressure must be applied to the brake pedal to ensure the vehicle is stationary

cardiagn.com

- OR

- The vehicle must be stationary and P or N selected on the TCS (Transmission Control Switch).

Before the engine is restarted, the following parameters must be detected:

- Drive 'D' or Sport 'S' selected on the TCS and the brake pedal is released
- The accelerator pedal is pressed (ECM detects a signal from the Accelerator Pedal Position (APP) sensor)
- A steering wheel paddle switch is operated to select a gear
- Reverse 'R' is selected on the TCS
- Climate control system demand increases (signal from the ATCM (Automatic Temperature Control Module))
- The vehicle speed exceeds approximately 1 km/h (0.5 mph)
- Primary and/or secondary battery charge becomes low (signal from the PSDB)
- Brake vacuum has been reduced from repeated use of pedal with engine not running (detected by ECM from the brake vacuum sensor)
- ECO stop/Start is deactivated using the ' ECO' switch in the floor console.

The following conditions will prevent an ECO stop:

- A steering wheel paddle switch has been used to select a gear
- The external ambient temperature is less than 0°C (32°F) (detected by ECM from ambient air temperature sensor)
- The external ambient temperature is more than 40°C (104°F) (detected by ECM from ambient air temperature sensor)
- The engine has not reached its optimum operating temperature (detected by ECM from Engine Coolant Temperature (ECT) sensor)

cardiagn.com

- The driver door is opened (detected by CJB from door ajar switch)
- The driver safety belt is not fastened (detected by RCM (Restraints Control Module) from driver seatbelt buckle switch)
- The climate control system requires the engine to be running, for example; windshield demist selected
- The primary and/or secondary battery charge is low (signal from the PSDB)
- The hood is open (detected by CJB from hood ajar switch)
- ECO stop/start is deactivated using the 'ECO' switch in the floor console.

The primary battery is used for the engine Stop/Start. The secondary battery is switched by the PSDB to maintain the car systems, for example, audio, climate or lights, which are then unaffected by the engine restart.
For additional information, refer to: Battery and Cables (414-01 Battery, Mounting and Cables, Description and Operation).

STOP/START STRATEGY

The TSS motor and the Intelligent Stop/Start system allows the vehicle engine to be restarted during an engine stop cycle, allowing the driver to proceed before the engine comes to a complete stop. This would not be possible without the TSS motor.

The feature of the motor and the pinion gear being operated individually allows meshing of the pinion gear with the drive plate ring gear, even if the engine is still operating. This allows seamless Stop/Start without hesitation.

Engine Speed above 350 RPM

When the ECO stop is initiated, the engine speed is at or above 350 RPM and the ECM detects engine restart parameters resulting from a driver action or system request, the ECM activates the fuel injection system to allow the engine to continue to operate. The TSS motor is not operated for an engine start under these conditions.

cardiagn.com

Engine Speed between 250 and 350 RPM

When an ECO stop is initiated, the engine speed is between 250 and 350 RPM and the ECM detects engine restart parameters resulting from a driver action or system request, the ECM operates the TSS motor to first accelerate the pinion gear up to the ring gear speed and then to engage the pinion gear with the ring gear to rotate the engine up to starting RPM. The ECM activates the fueling and engine systems to allow a restart.

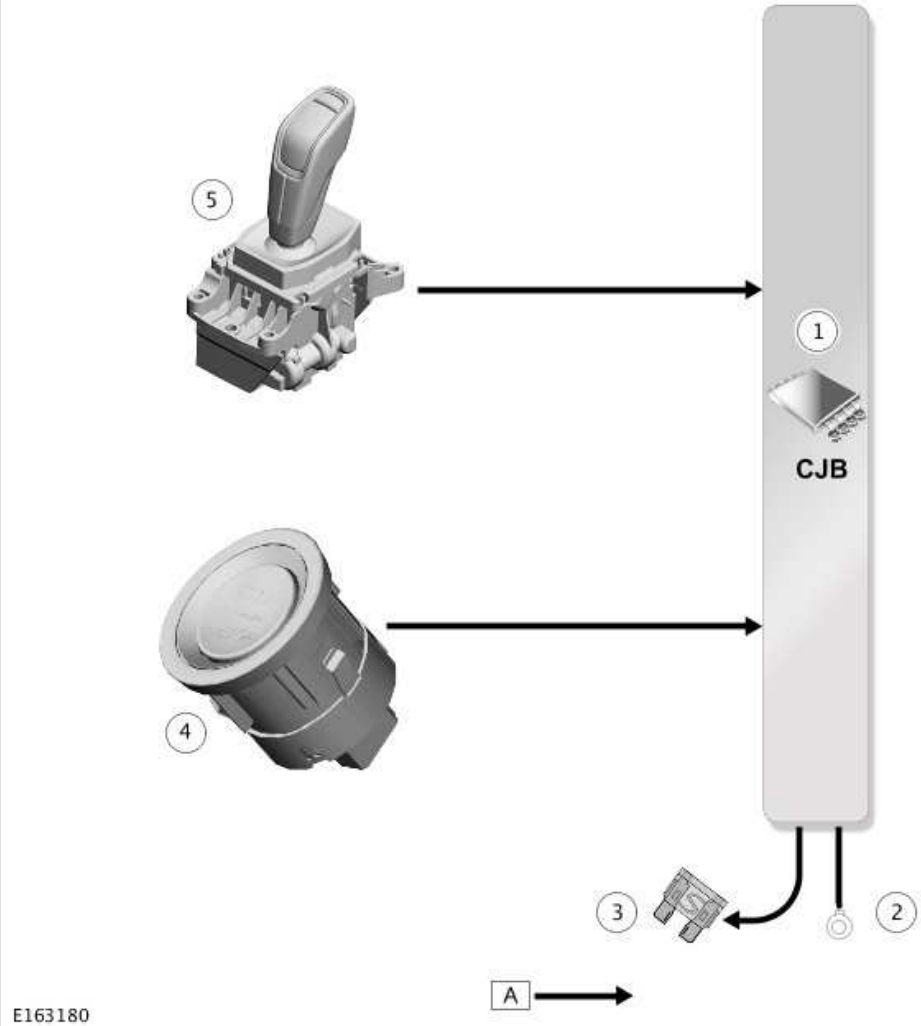
Engine Speed below 250 RPM

When an ECO stop is initiated, the engine speed is at or below 250 RPM and the ECM detects engine restart parameters resulting from a driver action or system request, the ECM operates the TSS motor to first engage the pinion gear with the ring gear and then operate the motor to rotate the engine up to starting RPM. The ECM activates the fueling and engine systems to allow a restart.

---

cardiagn.com

INPUT/OUTPUT DIAGRAM - SWITCH INPUT

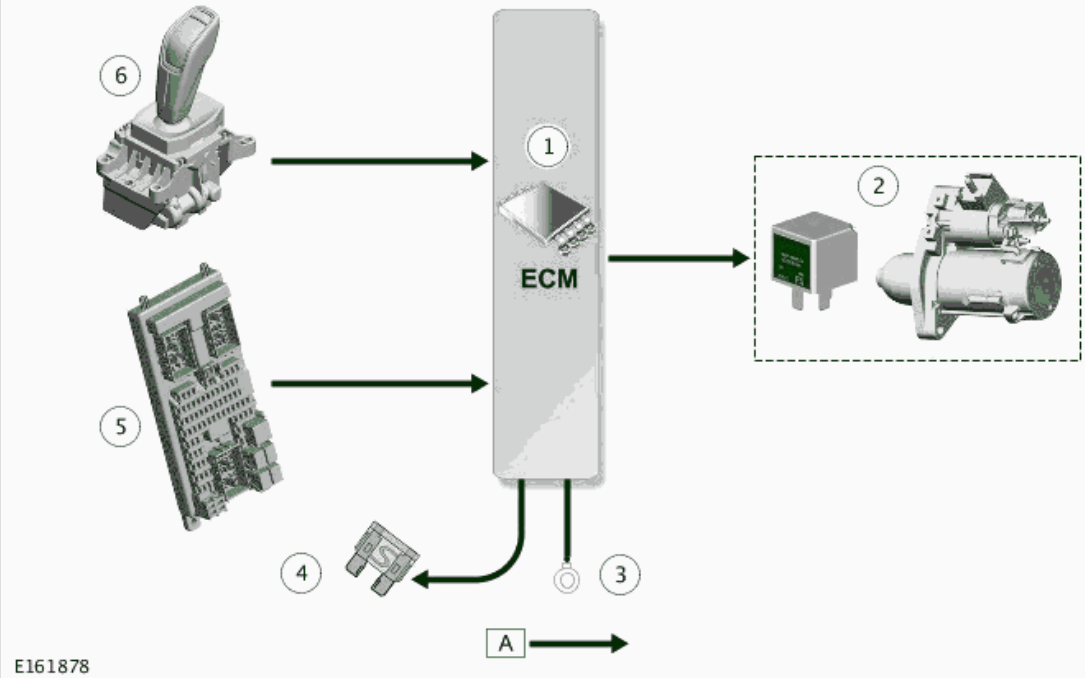


A = HARDWIRED.

ITEM	DESCRIPTION
1	Central Junction Box (CJB)
2	Ground
3	Power supply
4	Stop/start switch
5	Park/Neutral signal - Transmission Control Switch (TCS)

cardiagn.com

INPUT/OUTPUT DIAGRAM - VEHICLES WITHOUT START/STOP

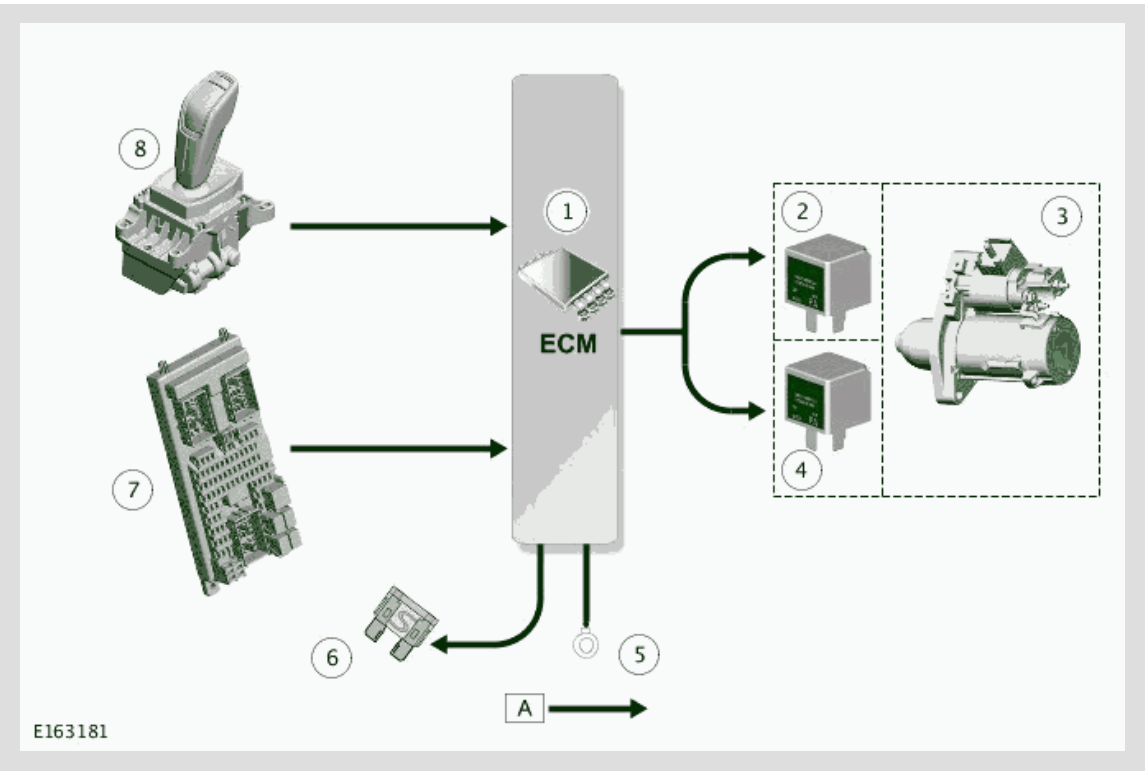


A = HARDWIRED.

ITEM	DESCRIPTION
1	Engine Control Module (ECM)
2	Starter motor
3	Ground
4	Power supply
5	Central Junction Box (CJB)
6	Park/Neutral signal - Transmission Control Switch (TCS)

cardiagn.com

INPUT/OUTPUT DIAGRAM - VEHICLES WITH START/STOP



A = HARDWIRED.

ITEM	DESCRIPTION
1	Engine Control Module (ECM)
2	Relay - Motor rotation
3	Tandem Solenoid Starter (TSS) motor
4	Relay - Pinion gear shift
5	Ground
6	Power supply
7	Central Junction Box (CJB)
8	Park/Neutral signal - Transmission Control Switch (TCS)

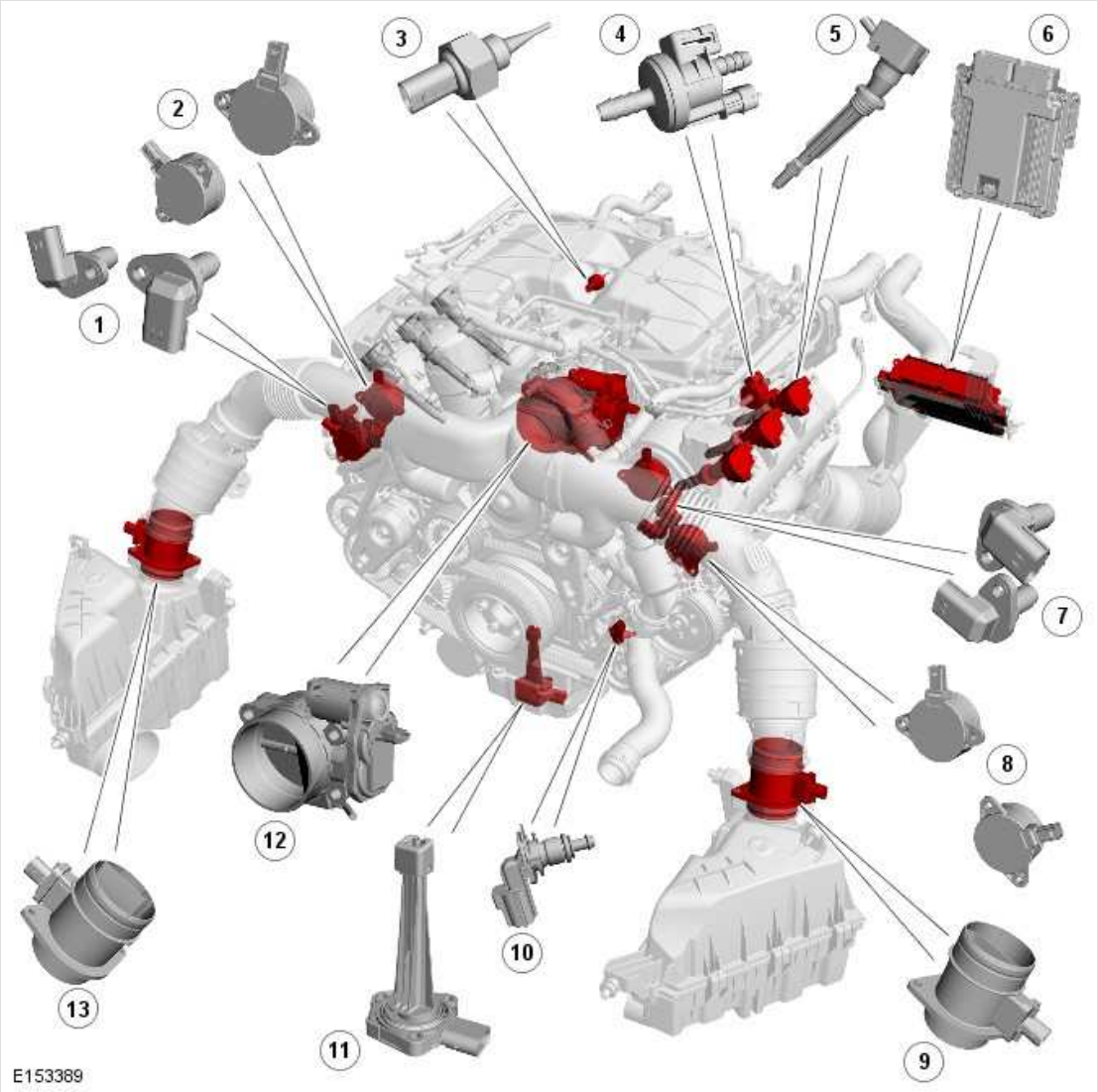
cardiagn.com

ELECTRONIC ENGINE CONTROLS - V6 S/C 3.0 L PETROL

DESCRIPTION AND OPERATION

COMPONENT LOCATION

Component Location 1 of 3



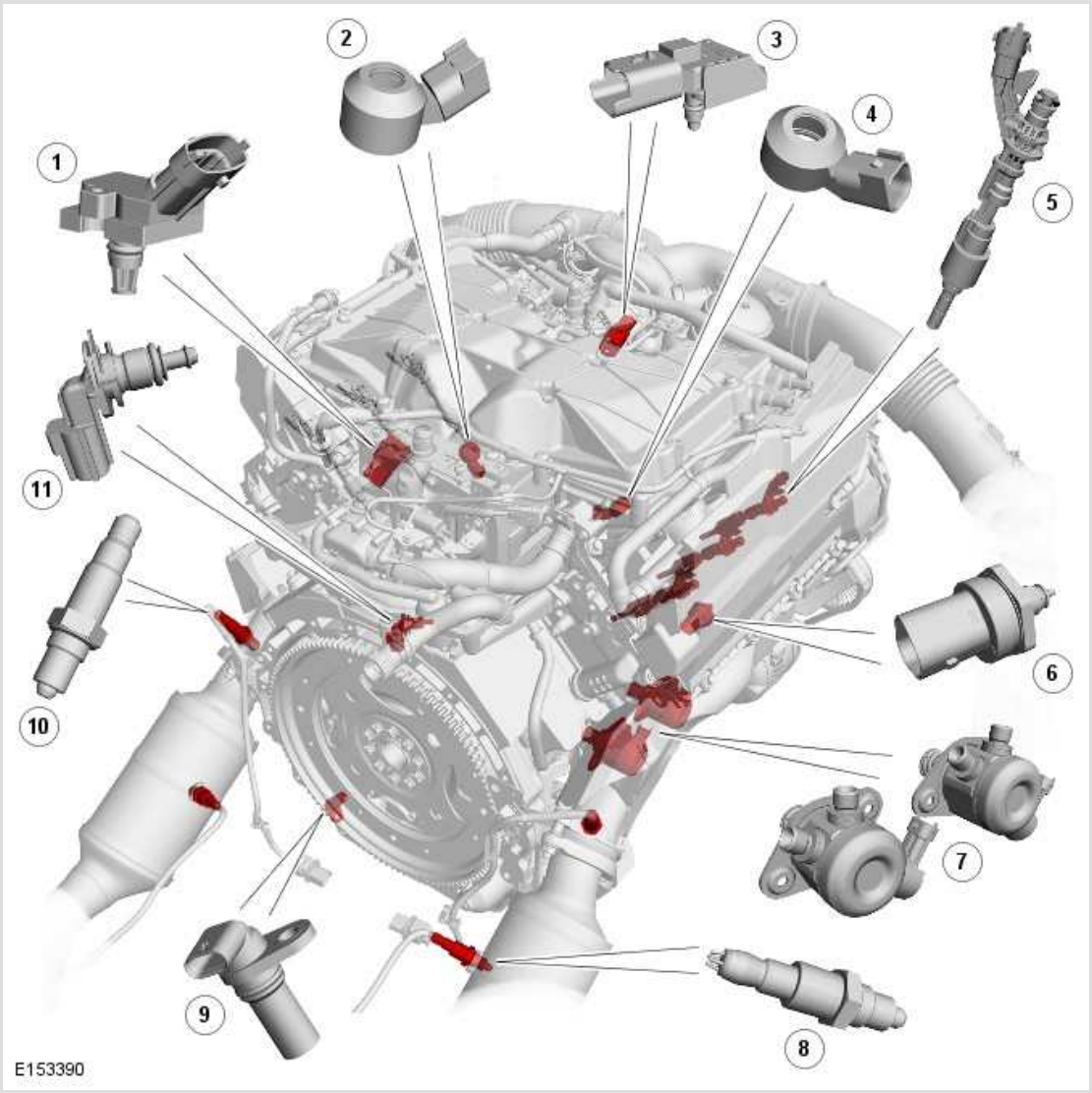
ITEM	DESCRIPTION
1	CMP (camshaft position) Sensor – Bank 2 (2 of)

cardiagn.com

2	VCT (variable camshaft timing) Actuator – Bank 2 (2 of)
3	Charge Air Temperature Sensor
4	EVAP (evaporative emissions) Purge Valve
5	Ignition Coil (6 of)
6	ECM (engine control module)
7	CMP (camshaft position) Sensor – Bank 1 (2 of)
8	VCT (variable camshaft timing) Actuator – Bank 1 (2 Of)
9	Left MAFT (mass air flow and temperature) Sensor
10	ECT (engine coolant temperature) Sensor 2
11	Oil Level and Temperature Sensor
12	Electric Throttle
13	Right MAFT (mass air flow and temperature) Sensor

Component Location 2 of 3

cardiagn.com

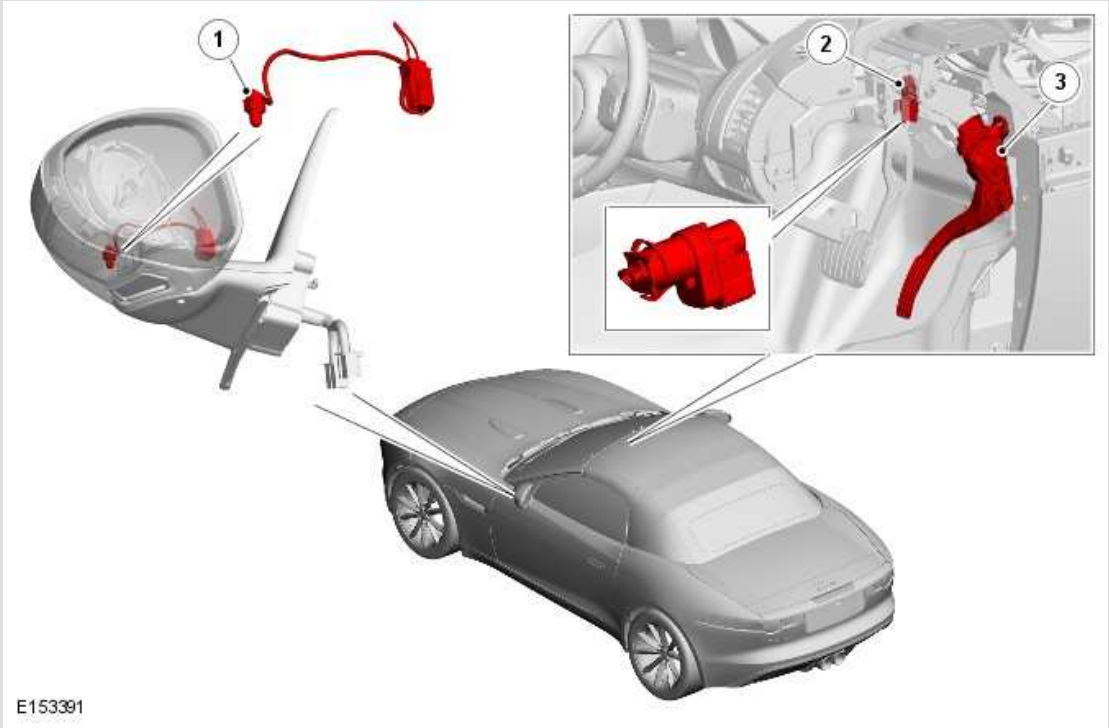


ITEM	DESCRIPTION
1	MAPT (manifold absolute pressure and temperature) Sensor
2	Knock Sensor – Bank 2
3	MAP (manifold absolute pressure) Sensor
4	Knock Sensor – Bank 1
5	Fuel Injector (6 of)
6	FRPT (fuel Rail pressure and temperature) Sensor
7	HP (high pressure) Pump (2 of)
8	HO2S (heated oxygen sensor) – Mid Catalyst (2 of)
9	CKP (crankshaft position) Sensor
10	HO2S (heated oxygen sensor) – Pre-Catalyst (2 of)

cardiagn.com

11	ECT (engine coolant temperature) Sensor 1

Component Location 3 of 3



ITEM	DESCRIPTION
1	AAT (ambient air temperature) Sensor
2	Brake Pedal Switch
3	APP (accelerator pedal position) Sensor

OVERVIEW

The electronic engine control system operates the engine to generate the output demanded by the APP (accelerator pedal position) sensor and loads imposed by other systems.

The electronic engine control system has an ECM (engine control module) that uses a torque-based strategy to evaluate inputs from sensors and other systems, and then produces outputs to engine actuators to produce the required torque.

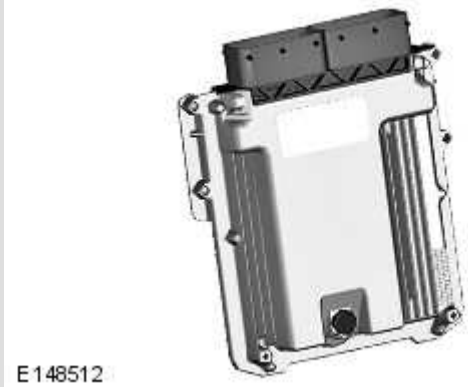
cardiagn.com

The electronic engine control system controls the following:

- Charge Air.
- Fueling.
- Ignition Timing.
- Valve Timing.
- Cylinder Knock.
- Idle Speed.
- Engine Cooling Fan.
- Evaporative Emissions.
- OBD (on-board diagnostic) .
- Immobilization System Interface.
- Speed Control.

DESCRIPTION

ENGINE CONTROL MODULE



The ECM is installed in the rear left corner of the engine compartment.

The ECM has the capability of adapting its fuel and ignition control outputs in response to several sensor inputs.

The ECM receives inputs from the following:

cardiagn.com

- CKP (crankshaft position) Sensor.
- CMP (camshaft position) Sensors (4 of).
- ECT (engine coolant temperature) Sensor (2 of).
- Knock Sensors (2 of).
- MAP (manifold absolute pressure) Sensor.
- MAFT (mass air flow and temperature) Sensors (2 of).
- MAPT (manifold absolute pressure and temperature) Sensor.
- TPS (throttle position sensor)
- HO2S (heated oxygen sensor) Sensors (4 of).
- APP Sensor.
- AAT (ambient air temperature) Sensor.
- FRPT (fuel rail pressure and temperature) Sensor
  For additional information, refer to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - V8 S/C 5.0L Petrol, Description and Operation).
- Engine Cooling Fan
  For additional information, refer to: Supercharger Cooling (303-03 Supercharger Cooling - V6 S/C 3.0L Petrol, Diagnosis and Testing).
- Brake Pedal Switch
  For additional information, refer to: Anti-Lock Control - Stability Assist (206-09 Anti-Lock Control - Stability Assist, Description and Operation).
- Speed Control Switch
  For additional information, refer to: Speed Control - V8 S/C 5.0L Petrol (310-03 Speed Control, Description and Operation).
- Oil Level and Temperature Sensor
  For additional information, refer to: Engine (303-01B Engine - V8 S /C 5.0L Petrol, Description and Operation).
- LP (low pressure) Fuel Sensor
  For additional information, refer to: Fuel Tank and Lines (310-01B

cardiagn.com

Fuel Tank and Lines - V8 S/C 5.0L Petrol, Description and Operation).

- FPDM (fuel pump driver module) For additional information, refer to: Fuel Tank and Lines (310-01B Fuel Tank and Lines - V8 S/C 5.0 L Petrol, Description and Operation).
- RCM (restraints control module) For additional information, refer to: Air Bag Supplemental Restraint System (SRS) (501-20B Supplemental Restraint System, Description and Operation).
- TCS (transmission control switch)
  For additional information, refer to: Intake Air Distribution and Filtering (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0 L Petrol, Description and Operation).
- Supercharger Bypass Valve Position Sensor
  For additional information, refer to: Intake Air Distribution and Filtering (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0 L Petrol, Description and Operation).
- Charge Air Temperature Sensor
  For additional information, refer to: Intake Air Distribution and Filtering (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0 L Petrol, Description and Operation).
- Brake Vacuum Sensor (if fitted)
  For additional information, refer to: Anti-Lock Control - Stability Assist (206-09 Anti-Lock Control - Stability Assist, Description and Operation).

The ECM provides outputs to the following:

- Electric Throttle.
- ECM Relay.
- Heater Elements of the HO2S (2 Of).
- Fuel Injectors (6 of)
  For additional information, refer to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - V8 S/C 5.0L Petrol, Description and Operation).

cardiagn.com

- Active Exhaust Solenoid Valve
  For additional information, refer to: Exhaust System (309-00B Exhaust System - V8 S/C 5.0L Petrol, Description and Operation).
- Ignition Coils (6 of)
  For additional information, refer to: Engine Ignition (303-07B Engine Ignition - V8 S/C 5.0L Petrol, Description and Operation).
- VCT (variable camshaft timing) Actuators (4 of)
  For additional information, refer to: Engine (303-01B Engine - V8 S /C 5.0L Petrol, Description and Operation).
- EVAP (evaporative emission) Purge Valve
  For additional information, refer to: Evaporative Emissions (303-13B Evaporative Emissions - V8 S/C 5.0L Petrol, Description and Operation).
- Engine Starter Motor Relay
  For additional information, refer to: Starting System (303-06B Starting System - V8 S/C 5.0L Petrol, Description and Operation).
- Engine Cooling Fan
  For additional information, refer to: Supercharger Cooling (303-03 Supercharger Cooling - V8 S/C 5.0L Petrol, Description and Operation) /
  Engine Cooling (303-03A Engine Cooling - V6 S/C 3.0L Petrol, Description and Operation).
- Charge Air Coolant Pump Relay
  For additional information, refer to: Supercharger Cooling (303-03 Supercharger Cooling - V6 S/C 3.0L Petrol, Diagnosis and Testing).
- HP (high pressure) Fuel Pump (2 of)
  For additional information, refer to: Fuel Charging and Controls (303-04 Fuel Charging and Controls - V8 S/C 5.0L Petrol, Description and Operation).
- FPDM For additional information, refer to: Fuel Tank and Lines (310-01B Fuel Tank and Lines - V8 S/C 5.0L Petrol, Description and Operation).

cardiagn.com

- DMTL (diagnostic module tank leakage)
  For additional information, refer to: Fuel Tank and Lines (310-01B Fuel Tank and Lines - V8 S/C 5.0L Petrol, Description and Operation).
- Supercharger Bypass Valve Actuator
  For additional information, refer to: Intake Air Distribution and Filtering (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0 L Petrol, Description and Operation).
- Inlet Manifold Tuning Valve
  For additional information, refer to: Intake Air Distribution and Filtering (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0 L Petrol, Description and Operation).

CRANKSHAFT POSITION SENSOR

The CKP sensor is an inductive sensor that allows the ECM to determine the angular position of the crankshaft and the engine speed.

The CKP sensor is installed in the rear left side of the oil pan, in line with the engine drive plate. The sensor is secured with a single screw and sealed with an O-ring. A three pin electrical connector provides the interface with the engine harness.

The head of the CKP sensor faces a reluctor ring pressed into the outer circumference of the engine drive plate. The reluctor ring has

cardiagn.com

60 teeth, with 2 teeth missing. There are 58 teeth at 6° intervals, with two teeth removed to provide a reference point with a centerline that is 21° BTDC (before top dead center) on cylinder 1 of bank 2.

If the CKP sensor fails, the ECM :

- Uses signals from the CMP sensors to determine the angular position of the crankshaft and the engine speed
- Adopts a limp home mode where engine speed is limited to a maximum of 3000 rev/min.

With a failed CKP sensor, engine starts will require a long crank time while the ECM determines the angular position of the crankshaft using the CMP sensors.

CAMSHAFT POSITION SENSORS

The CMP sensors are Magneto Resistive Element (MRE) sensors that allow the ECM to determine the angular position of the camshafts. MRE sensors produce a digital output which allows the ECM to detect speeds down to zero.

Four CMP sensors are installed in the front upper timing covers, one for each camshaft.

Each CMP sensor is secured with a single screw and sealed with an O-ring. On each CMP sensor, a three pin electrical connector provides the interface with the engine harness.

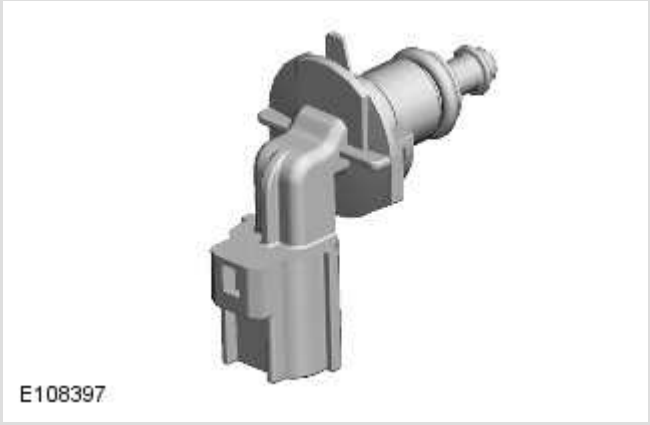
cardiagn.com

The head of each CMP sensor faces a sensor wheel attached to the front of the related VCT unit.

If an exhaust CMP sensor fails, the ECM disables the VCT of both exhaust camshafts.

If an intake CMP sensor fails, the ECM disables the VCT of both intake camshafts. This can result in the engine being slow, or failing, to start.

ENGINE COOLANT TEMPERATURE SENSORS



The ECT sensors are NTC (negative temperature coefficient) thermistors that allow the ECM to monitor the engine coolant temperature.

There are two identical ECT sensors installed, which are identified as ECT 1 and ECT 2. Each sensor is secured with a twist-lock and latch mechanism, and is sealed with an O-ring. A two pin electrical connector provides the interface between the sensor and the engine harness.

ECT 1

ECT 1 is installed in the heater manifold, at the rear of the bank 1 cylinder head. The input from this sensor is used in calibration tables and by other systems.

cardiagn.com

If there is an ECT 1 fault, the ECM adopts an estimated coolant temperature. On the second consecutive trip with an ECT 1 fault, the ECM illuminates the MIL (malfunction indicator lamp) .

ECT 2

ECT 2 is installed in the lower hose connector which attaches to the bottom of the thermostat. The input from this sensor is used for OBD 2 diagnostics and, in conjunction with the input from ECT 1, to confirm that the thermostat is functional.

If there is an ECT 2 fault, the ECM illuminates the MIL on the second consecutive trip.

KNOCK SENSORS

The knock sensors are piezo-ceramic sensors that allow the ECM to employ active knock control and prevent engine damage from pre-ignition or detonation.

One knock sensor is installed on the inboard side of each cylinder head, adjacent to the air intake for cylinders 3 and 4. Each knock sensor is secured with a single screw. On each knock sensor, a two pin electrical connector provides the interface with the engine harness.

The ECM compares the signals from the knock sensors with mapped values stored in memory to determine when detonation occurs on

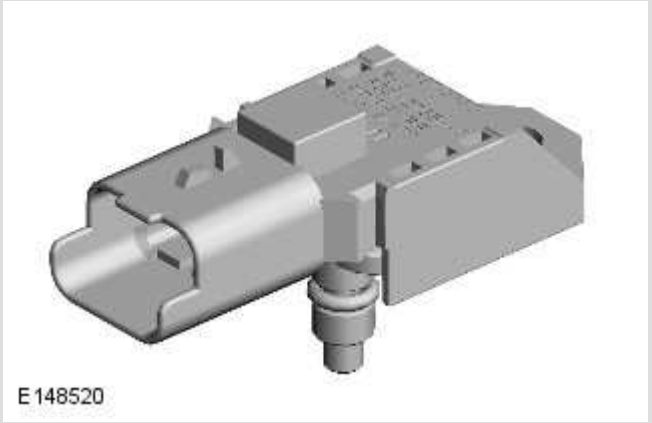
cardiagn.com

individual cylinders. When detonation is detected, the ECM retards the ignition timing on that cylinder for a number of engine cycles, and then gradually returns it to the original setting.

The ECM cancels closed loop control of the ignition system if the signal received from a knock sensor becomes implausible. In these circumstances the ECM defaults to base mapping for the ignition timing. This ensures the engine will not become damaged if low quality fuel is used. The MIL will not illuminate, although the driver may notice that the engine 'pinks' in some driving conditions and displays a drop in performance and smoothness.

The ECM calculates the default value if a sensor fails on either bank of cylinders.

MANIFOLD ABSOLUTE PRESSURE SENSOR



The MAP sensor allows the ECM to calculate the load on the engine, which is used in the calculation of fuel injection time.

The MAP sensor is installed in the air inlet of the supercharger. The sensor is secured with a single screw and sealed with an O-ring. A three pin electrical connector provides the interface with the engine harness.

If the MAP sensor fails, the ECM adopts a default value of 1 bar (14.5 lbf/in.2).

With a failed MAP sensor, the engine will suffer from poor starting, rough running and poor drive ability.

cardiagn.com

MANIFOLD ABSOLUTE PRESSURE AND TEMPERATURE SENSOR

The MAPT sensor allows the ECM to calculate the air charge density immediately before it enters the cylinders. This is used to adjust the ignition timing relative to the boost pressure, and to monitor the performance of the charge air coolers.

The MAPT sensor is installed in the left charge air cooler outlet. The sensor is secured with a single screw and sealed with an O-ring. A four pin electrical connector provides the interface with the engine harness.

MASS AIR FLOW AND TEMPERATURE SENSOR

The MAPT sensors allow the ECM to measure the mass flow and the temperature of the air flow into the engine. The mass air flow is measured with a hot film element in the sensor. The temperature of the air flow is measured with a NTC thermistor in the sensor. The

cardiagn.com

mass air flow is used to determine the fuel quantity to be injected in order to maintain the target air/fuel mixture required for correct operation of the engine and the catalytic converters.

There are two MAFT sensors installed, one in each air cleaner outlet duct. Each MAFT sensor is integral with the intake duct. On each MAFT sensor, a five pin electrical connector provides the interface with the engine harness.

If the hot film element signal fails, the ECM invokes a software backup strategy to calculate the mass air flow from other inputs. Closed loop fuel control, closed loop idle speed control and evaporative emissions control are suspended. The engine will suffer from poor starting, poor throttle response and, if the failure occurs while driving, the engine speed may dip and surging may occur before recovering.

If the NTC thermistor signal fails the ECM adopts a default value of 25 °C (77 °F) for the intake air temperature.

THROTTLE POSITION SENSOR

The TPS (throttle position sensor) allow the ECM to determine the position and angular rate of change of the throttle blade.

There are two TPS located in the electric throttle. See below for details of the electric throttle.

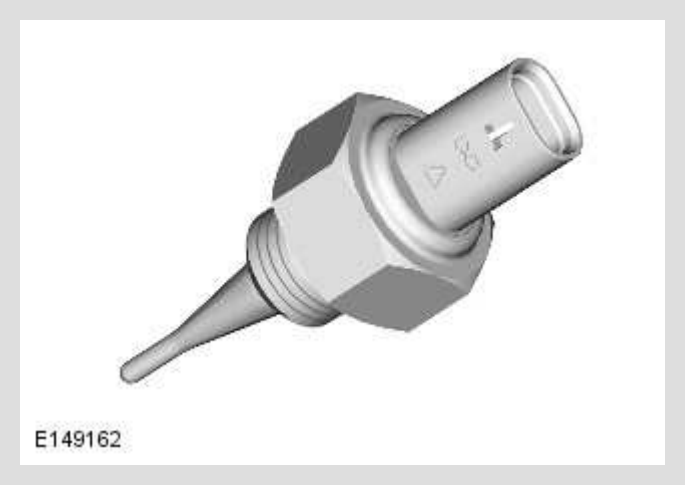
If a TPS fails, the ECM :

- Adopts a limp home mode where engine speed is limited to a maximum of approximately 2000 rev/min.
- Discontinues evaporative emissions control.
- Discontinues closed loop control of engine idle speed.

With a failed TPS, the engine will suffer from poor running and throttle response.

CHARGE AIR TEMPERATURE SENSOR

cardiagn.com



The charge air temperature sensor is installed in the supercharger top cover. A two pin electrical connector provides the interface between the sensor and the engine harness. The sensor contains an NTC thermistor with supply and return connections to the ECM .

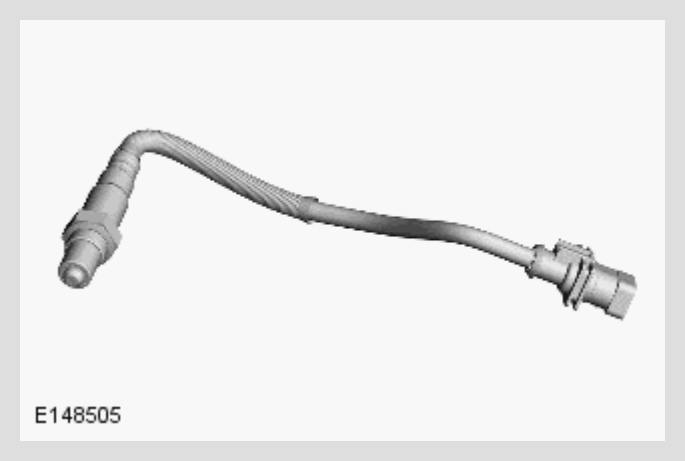
The ECM supplies the sensor with a 5V reference voltage and translates the return voltage into a temperature. The ECM uses the input:

- To monitor operation of the charge air coolant pump.
- For air mass calculations used in control of the supercharger bypass valve, as part of the charge air strategy that co-ordinates operation of the electric throttle and the bypass valve, and predicts the air mass delivered to the cylinders.

If the charge air temperature sensor fails, the ECM substitutes the input with a modelled temperature. Failure of the sensor is unlikely to be noticeable to the driver.

HEATED OXYGEN SENSORS

cardiagn.com



The HO2S allow the ECM to measure the oxygen content of the exhaust gases, for closed loop control of the fuel and air mixture and for catalytic converter monitoring.

A pre-catalyst HO2S is installed in the outlet of each exhaust manifold, which enables independent control of the fuel and air mixture for each cylinder bank. A mid catalyst HO2S is installed in a central position on the side of each catalytic converter and a post catalyst HO2S is installed in each catalytic converter outlet pipe in the exhaust system; these enable the performance of the catalytic converter to be optimized and monitored.

HO2S need to operate at high temperatures in order to function correctly. To achieve the high temperatures required, the sensors are fitted with heater elements that are controlled by a PWM (pulse width modulation) signal from the ECM . The heater elements are operated after each engine start, once it has been calculated that there is no moisture in the exhaust (between 0 and 10 minutes delay), and also during low load conditions when the temperature of the exhaust gases is insufficient to maintain the required sensor temperature. The

cardiagn.com

time period for operation of the heater elements is determined by the temperature of the post catalyst HO2S . The PWM duty cycle is carefully controlled to prevent thermal shock to cold sensors. A non-functioning heater delays the sensor’s readiness for closed loop control and increases emissions.

The pre catalyst HO2S produce a constant voltage, with a variable current that is proportional to the lambda ratio. The mid and post catalyst HO2S produce an output voltage dependant on the ratio of the exhaust gas oxygen to the ambient oxygen.

The HO2S age with mileage, increasing their response time to switch from rich to lean and lean to rich. This increase in response time influences the ECM ECM closed loop control and leads to progressively increased emissions. Measuring the period of rich to lean and lean to rich switching monitors the response rate of the pre catalyst sensors.

Diagnosis of electrical faults is continually monitored in pre, mid and post catalyst sensors. This is achieved by checking the signal against maximum and minimum threshold, for open and short circuit conditions.

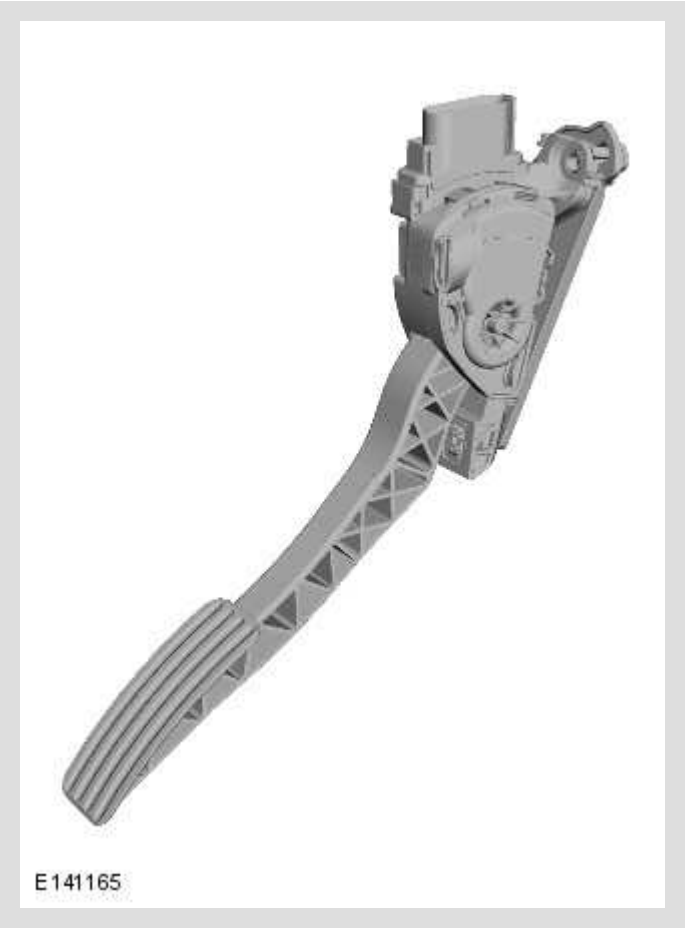
If a HO2S fails:

- The ECM defaults to open loop fueling for the related cylinder bank.
- The CO (carbon monoxide) and emissions content of the exhaust gases may increase.
- The exhaust may smell of rotten eggs (hydrogen sulphide H2S).

With a failed HO2S , the engine will suffer from reduced refinement and performance.

ACCELERATOR PEDAL POSITION SENSOR

cardiagn.com



The APP sensor allows the ECM to determine the driver requests for vehicle speed, acceleration and deceleration. The ECM uses this information, together with information from the ABS (anti-lock brake system) control module and the TCM (transmission control module) , to determine the setting of the electric throttle.

Three screws attach the APP sensor and integrated accelerator pedal to a bracket on the lower instrument panel. A six pin electrical connector provides the interface with the vehicle harness.

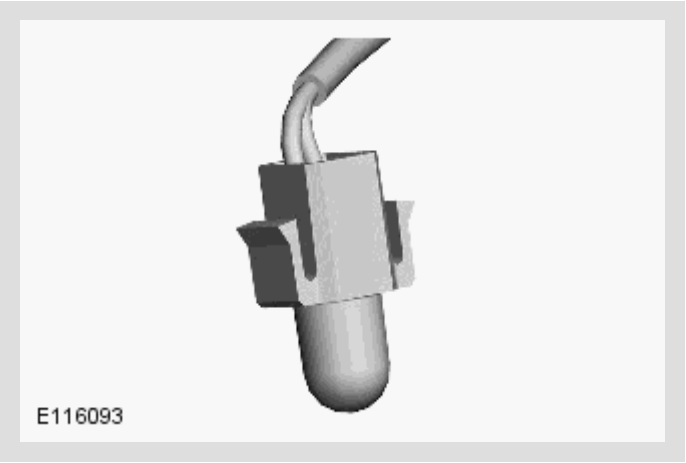
The APP sensor is a twin track potentiometer. Each track receives an independent power supply from the ECM and returns an independent analog signal to the ECM . Both signals contain the same positional information, but the signal from track 2 is half the voltage of the signal from track 1 at all positions.

cardiagn.com

If both signals have a fault, the ECM adopts a limp home mode, which limits the engine speed to 2000 rev/min maximum.

The ECM constantly checks the range and plausibility of the two signals and stores a fault code if it detects a fault.

AMBIENT AIR TEMPERATURE (AAT) SENSOR



The AAT (ambient air temperature) sensor is a NTC thermistor that allows the ECM to monitor the temperature of the air around the vehicle. The ECM uses the AAT sensor input for a number of functions, including engine cooling fan control. The ECM also transmits the ambient air temperature on the HS (high speed) CAN (controller area network) bus for use by other control modules.

The AAT sensor is installed in the left exterior mirror, with the bulb of the sensor positioned over a hole in the bottom of the mirror casing.

The ECM supplies the sensor with a 5 V reference voltage and a ground, and translates the return signal voltage into a temperature.

If there is a fault with the AAT sensor, the ECM calculates the AAT from the temperature inputs of the MAFT sensors. If the AAT sensor and the temperature inputs of the MAFT sensors are all faulty, the ECM adopts a default ambient temperature of 25 °C (77 °F).

ELECTRIC THROTTLE

cardiagn.com

The ECM uses the electric throttle to help regulate engine torque.

The electric throttle is installed between the t-piece duct of the intake air distribution and filtering system, and the inlet of the supercharger. For additional information, refer to: Intake Air Distribution and Filtering (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Description and Operation).

The throttle plate is operated by an electric DC (direct current) motor integrated into the throttle body. The ECM uses a PWM signal to control the DC motor. The ECM compares the APP sensor inputs against an electronic request or value to determine the required position of the throttle plate. The ECM and electric throttle are also required to:

- Monitor requests for speed control operation.

cardiagn.com

- Automatically operate the electric throttle for accurate speed control.
- Perform all DSC (dynamic stability control) engine interventions.
- Monitor and carry out maximum engine speed and road speed cut outs.
- Provide different engine maps for the ride and handling optimization system.

A software strategy within the ECM calibrates the position of the throttle plate at the beginning of each ignition cycle. When the ignition is turned on, the ECM performs a self-test and calibration routine by fully closing the throttle plate and then opening it again. This tests the default position springs and allows the ECM to learn the fully closed position.

OPERATION

ENGINE CONTROL MODULE RELAY

The ECM relay is used to initiate the power up and power down routines within the ECM .

The ECM relay is installed in the EJB (engine junction box) .

When the ignition is turned on, battery voltage is applied to the ignition sense input from the CJB (central junction box) . The ECM then starts its power up routines and energizes the ECM relay.

When the ignition is turned off, the ECM maintains its powered up state while it conducts the power down routines. This can be for:

- Up to 20 minutes in extreme cases, when the DMTL (diagnostic module tank leakage) system is running (NAS markets)
- Up to 5 minutes when cooling fans are required.

On completion of the power down routines the ECM de-energizes the ECM relay.

cardiagn.com

ECM ADAPTIONS

The ECM has the ability to adapt the input values it uses to control certain outputs. This capability maintains engine refinement and ensures the engine emissions remain within the legislated limits. The components which have adaptions associated with them are:

- The APP .
- The HO2S
- The MAFT Sensor.
- The CKP Sensor.
- Electric Throttle.
- Knock Sensors.

HEATED OXYGEN AND MASS AIR FLOW AND TEMPERATURE SENSORS

There are several adaptive maps associated with the fueling strategy. Within the fueling strategy the ECM calculates short-term adaptions and long term adaptions. The ECM will monitor the deterioration of the HO2S (heated oxygen sensor)'s over a period of time. It will also monitor the current correction associated with the sensors.

The ECM will store a fault code in circumstances where an adaption is forced to exceed its operating parameters. Simultaneously, the ECM will record the engine speed, engine load and intake air temperature.

CRANKSHAFT POSITION SENSOR

The characteristics of the signal supplied by the CKP sensor are learned by the ECM . This enables the ECM to set an adaption and support the engine misfire.

detection function. Due to a small variation between different drive plates and different CKP sensors, the adaption must be reset if either component is renewed, or removed and refitted. It is also necessary to reset the drive plate adaption if the ECM is renewed or replaced.

cardiagn.com

The ECM supports four drive plate adaptions for the CKP sensor. Each adaption relates to a specific engine speed range. The engine speed ranges are detailed in the table below:

ADAPTION	ENGINE SPEED REV/MIN
1	1800 - 3000
2	3001 - 3800
3	3801 – 4600
4	4601 - 5400

MISFIRE DETECTION

Legislation requires that the ECM must be able to detect the presence of an engine misfire. It must be able to detect misfires at two separate levels. The first level is an amount of misfire that could lead to the legislated emissions limit being exceeded by a given amount. The second level is a misfire rate that causes degradation in catalytic converter efficiency.

The ECM monitors the number of misfire occurrences within two engine revolution ranges. If the ECM determines a misfire failure within either of these two ranges, over two consecutive journeys, it will record a fault code and details of the engine speed, engine load and engine coolant temperature. In addition, if the second level of misfire occurs, on any trip, the ECM flashes the MIL while the fault is occurring.

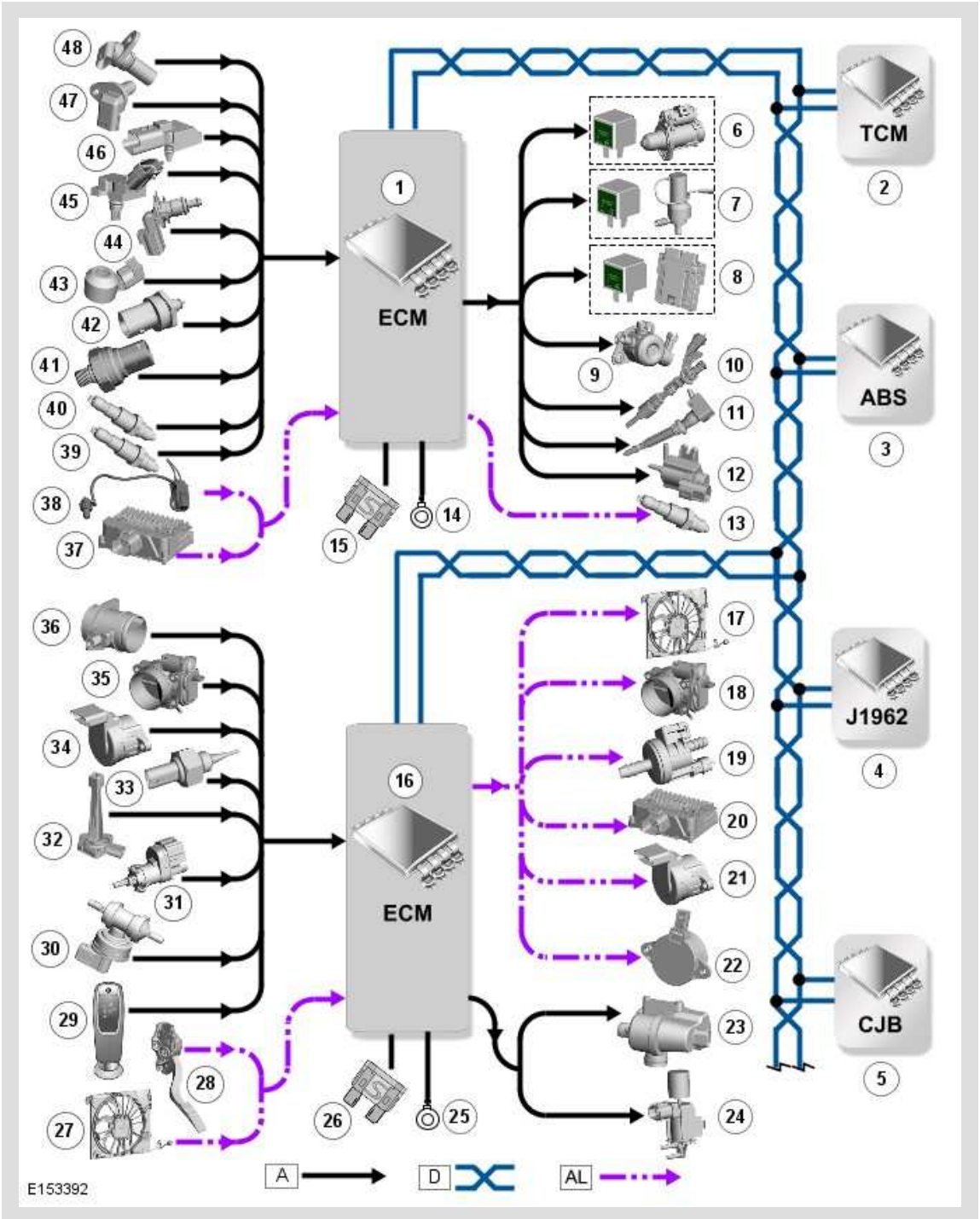
The signal from the CKP sensor indicates how fast the poles on the drive plate are passing the sensor tip. A sine wave is generated each time a pole passes the sensor tip. The ECM can detect variations in drive plate speed by monitoring the sine wave signal supplied by the crankshaft position sensor. By assessing this signal, the ECM can detect the presence of an engine misfire. The ECM will evaluate the signal against a number of factors and will decide whether to record the occurrence or ignore it. The ECM can assign a misfire judgement to an individual cylinder, which can be viewed on Jaguar approved diagnostic equipment

cardiagn.com

DIAGNOSTICS

The ECM stores each fault as a DTC (diagnostic trouble code) . The DTC and associated environmental and freeze frame data can be read using Jaguar approved diagnostic equipment, which can also read real time data from each sensor, the adaption values currently being employed and the current fueling, ignition and idle speed settings.

INPUT AND OUTPUT CONTROL DIAGRAM



cardiagn.com

ITEM	DESCRIPTION
1	ECM (engine control module)
2	TCM (transmission control module)
3	ABS (anti-lock brake system control module)
4	J1962 (diagnostic connector)
5	CJB (central junction box)
6	Starter motor relay
7	Charge air coolant pump relay
8	ECM (engine control module) Relay
9	HP (high pressure) Fuel Pump (2 of)
10	Fuel Injector (6 of)
11	Ignition Coil (6 of)
12	Inlet Manifold Tuning Valve
13	HO2S (heated oxygen sensor) – Pre-Catalyst (2 of)
14	Ground
15	Power Supply
16	ECM (engine control module)
17	Engine Cooling Fan
18	Electric Throttle
19	EVAP (evaporative emissions) Purge Valve
20	FPDM (fuel pump driver module)
21	Supercharger Bypass Valve Actuator
22	VCT (variable camshaft timing) Actuators (4 of)
23	VCT (variable camshaft timing) Actuators (4 of)
24	DMTL (diagnostic module tank leakage) Pump
25	Active Exhaust Solenoid Valve
26	Ground
27	Power Supply

cardiagn.com

28	Engine Cooling Fan
29	APP (accelerator pedal position) Sensor
30	TCS (transmission control switch)
31	Brake Vacuum Sensor (if fitted)
32	Brake Pedal Switch
33	Oil Level and temperature sensor
34	Charge air temperature sensor
35	Supercharger bypass valve actuator
36	TPS (throttle position sensor)
37	MAFT (mass air flow and temperature) sensor (2 of)
38	FPDM (fuel pump driver module)
39	AAT (ambient air temperature) sensor
40	HO2S (heated oxygen sensor) – mid-catalyst (2 of)
41	HO2S (heated oxygen sensor) – post-catalyst (2 of)
42	LP (low pressure) fuel sensor
43	Knock sensor (4 of)
44	ECT (engine coolant temperature) sensor (2 of)
45	MAPT (manifold absolute pressure and temperature) sensor
46	MAP (manifold absolute pressure) sensor
47	CMP (camshaft position) sensor (4 of)
48	CKP (crankshaft position) sensor

cardiagn.com

ENGINE OIL DRAINING AND FILLING (G1586896)

GENERAL PROCEDURES

12.60.07	ENGINE OIL - DRAIN AND REFILL	ALL DERIVATIVES	0.5	USED WITHINS	

DRAINING

WARNING:

The spilling of hot engine oil is unavoidable during this procedure, care must be taken to prevent scalding.

NOTES:

- Clean the components general area prior to dismantling.
- Some variation in the illustrations may occur, but the essential information is always correct.

1.

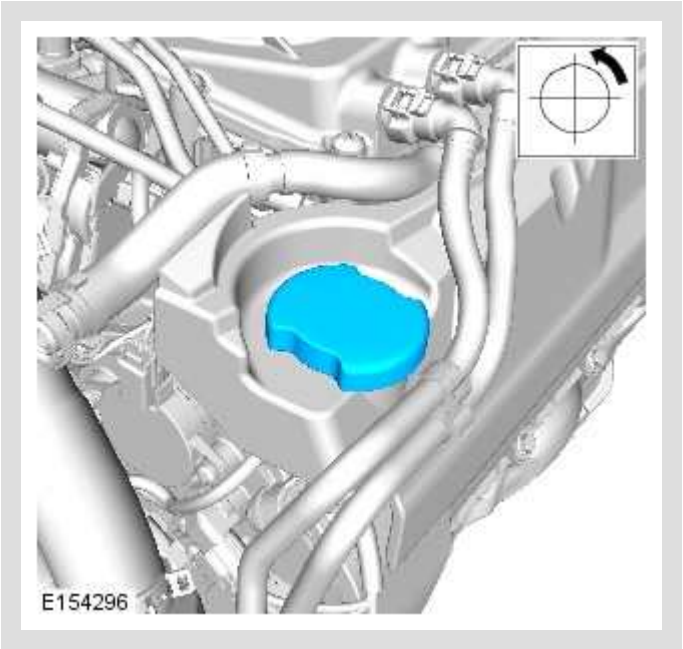
CAUTION:

Make sure the engine is warm.

Start the engine and allow to run for 10 minutes, stop the engine.

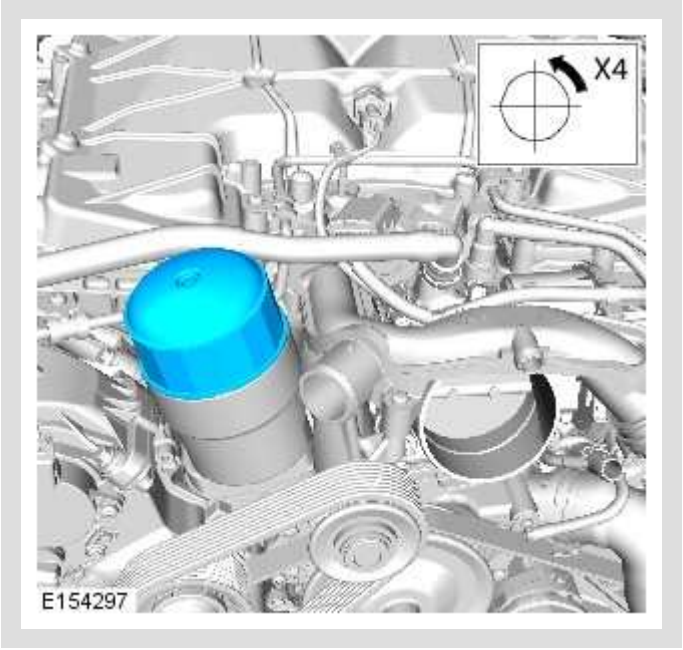
2.

cardiagn.com



3. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

4.



Loosen the element cover 4 complete turns to allow engine oil to drain from the filter cover.

cardiagn.com

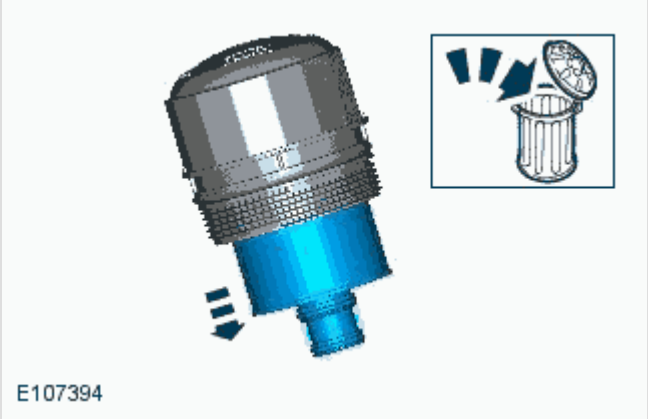
Make sure that the O-ring seal is exposed.

5.

NOTES:

- Allow 10 minutes for the engine oil to drain from the oil filter housing.
- Remove and discard the O-ring seal.
- Position cloth to collect fluid spillage, make sure fluid does not come in to contact with the accessory drive belts.

6.



Remove and discard the oil filter element.

cardiagn.com

7. **WARNING:**

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

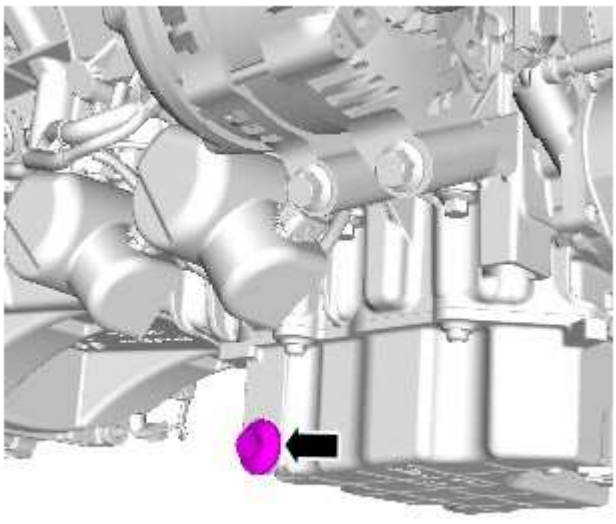
8. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

9. **CAUTIONS:**

- Be prepared to collect escaping oil.
- Allow at least 10 minutes for the engine oil to drain.

NOTE:

Discard the oil pan drain plug.



E154299

cardiagn.com

FILLING

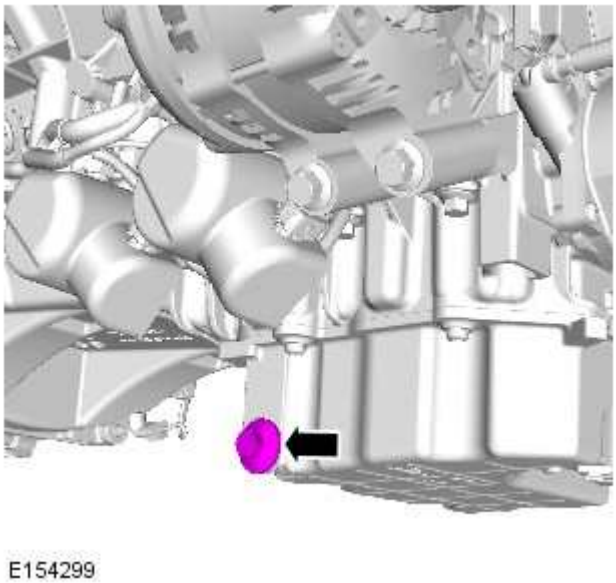
1.

CAUTION:

Make sure that the area around the component is clean and free of foreign material.

NOTE:

Install a new oil pan drain plug.



Torque: **24 Nm**

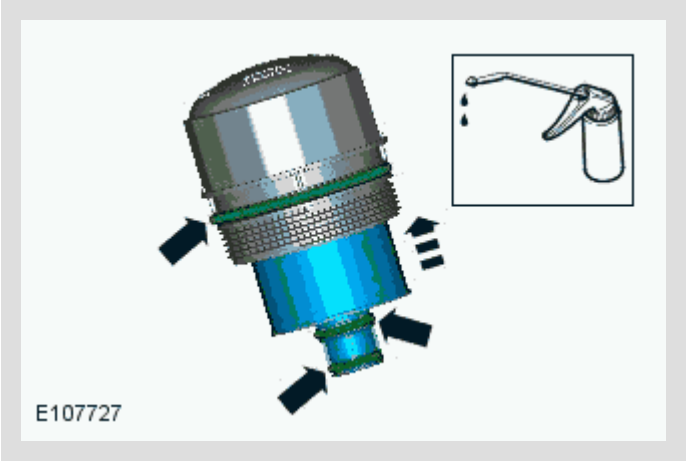
2. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

3.

NOTE:

Install new O-ring seals.

cardiagn.com

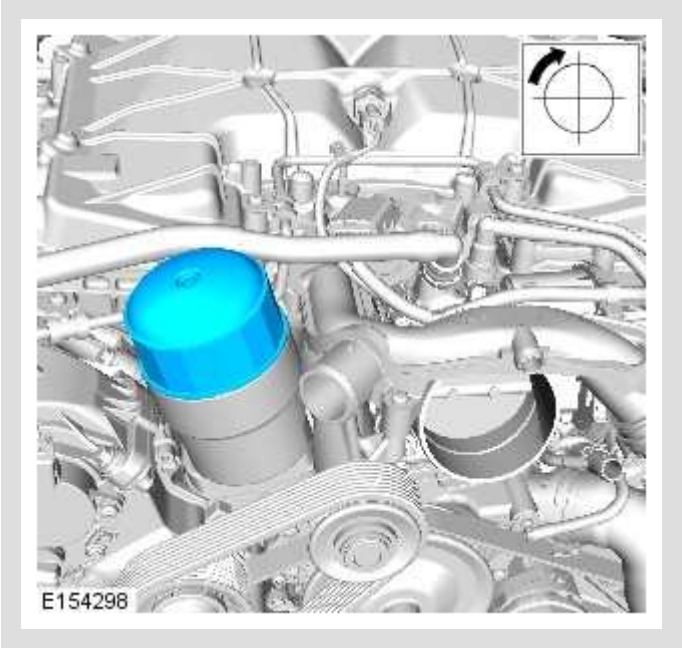


Lubricate the oil filter element O-ring seal with clean engine oil.

4.

CAUTION:

Tighten the component finger tight first.



Torque: **25 Nm**

5.

CAUTION:

cardiagn.com

Make sure that the vehicle is left for 5 minutes from filling with oil and that the engine oil level is reading at least minimum, before starting the engine. To check engine oil level follow steps 9-13.

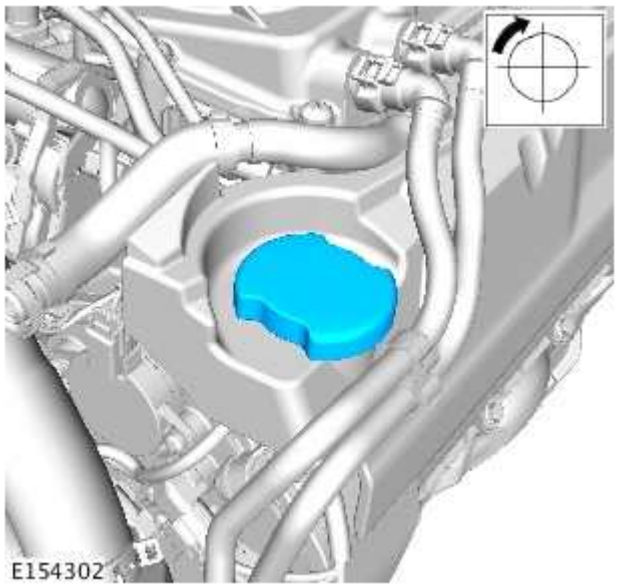
Fill the engine with oil.

Clean any residual engine oil from the oil filler cap area.
Refer to: Specifications (303-01A Engine - V6 S/C 3.0L Petrol, Specifications).
Refer to: Specifications (303-01B Engine - V8 S/C 5.0L Petrol, Specifications).

6.

CAUTION:

Correct installation of the oil filler cap can be obtained by tightening the cap until hard stop.



7.

CAUTION:

cardiagn.com

Make sure that the vehicle has been left for 5 minutes from filling with oil.

Follow the Steps 9-13 before starting the engine.

8.

Start the engine and allow to run for 10 minutes, stop the engine.

Check for leaks.

9.

CAUTIONS:

Make sure that the vehicle is parked on level ground.

Make sure that the selector lever and the gearshift mechanism are in the park (P) position.

Make sure that the hood is open.

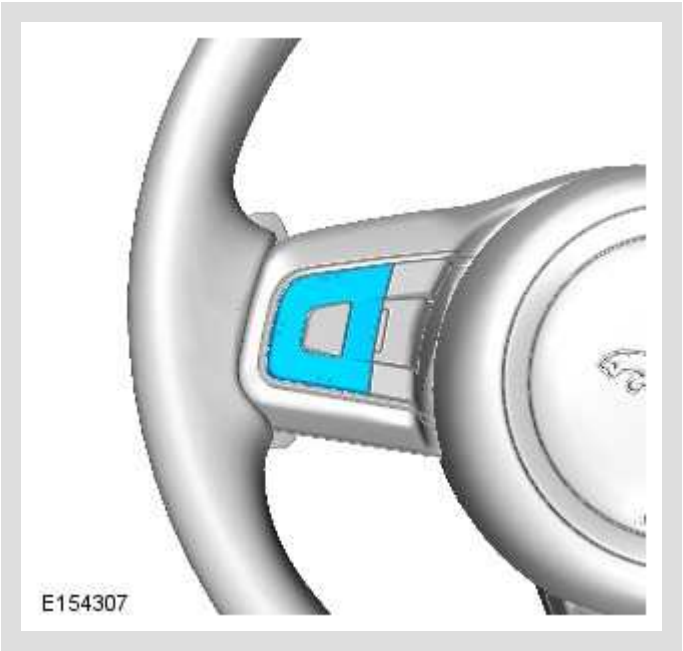
NOTE:

Allow 10 minutes from the engine switch off for the engine oil level to stabilize.

Turn the ignition on.

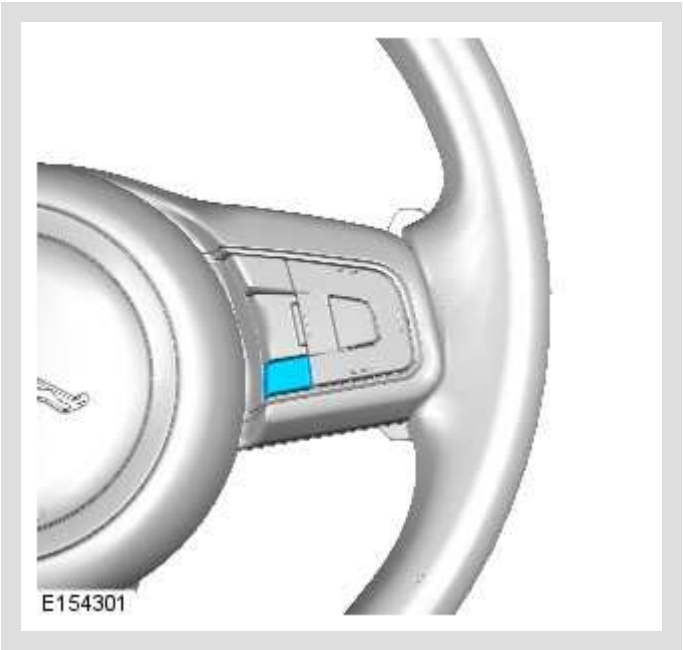
10.

cardiagn.com



Scroll through the message center to access the engine oil level display.

11.



Press the cruise control cancel button twice within 2 seconds.

cardiagn.com

12.

This display is now the live reading of the engine oil level.

Take a reading from the level display and, if necessary, top up with oil as instructed.

13.

NOTE:

If instructed to follow Steps 9-13 in a previous step, return to Step 8 and continue the procedure.

Turn the ignition off.

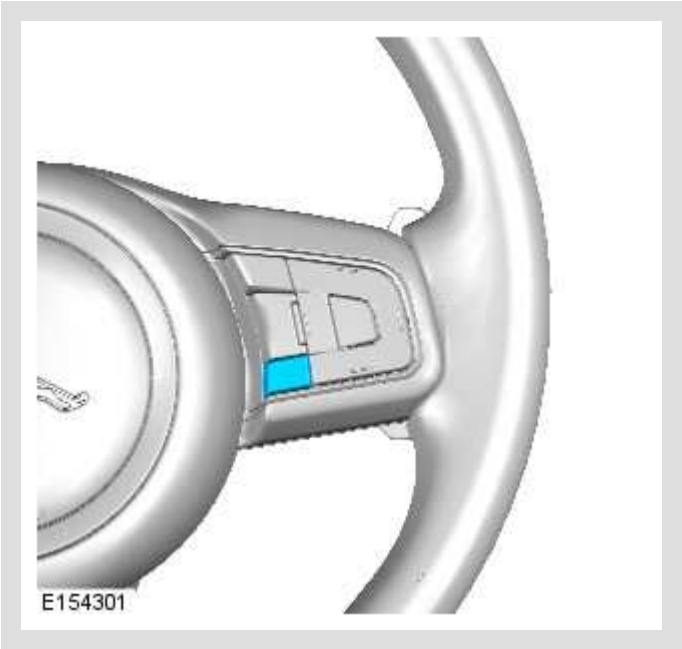
14. Allow 10 minutes for the engine oil level to stabilize if there has been additional oil top up.

15.

NOTE:

The following steps are to update the average oil level value.

cardiagn.com



Turn the ignition on.

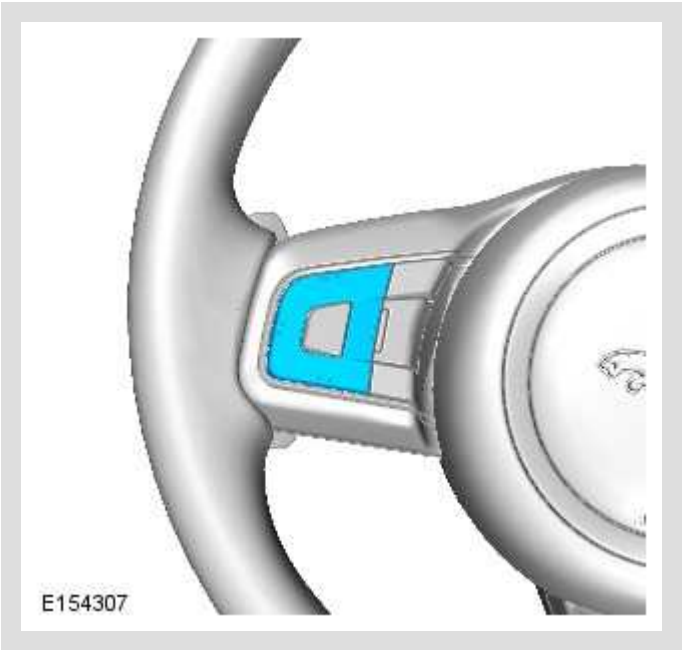
Press and hold the cruise control cancel button for more than 5 seconds.

16. Turn the ignition off.

17. Turn the ignition on.

18.

cardiagn.com



Scroll through the trip menu to access the engine oil level display.

Make sure that the average oil level value has now been updated.

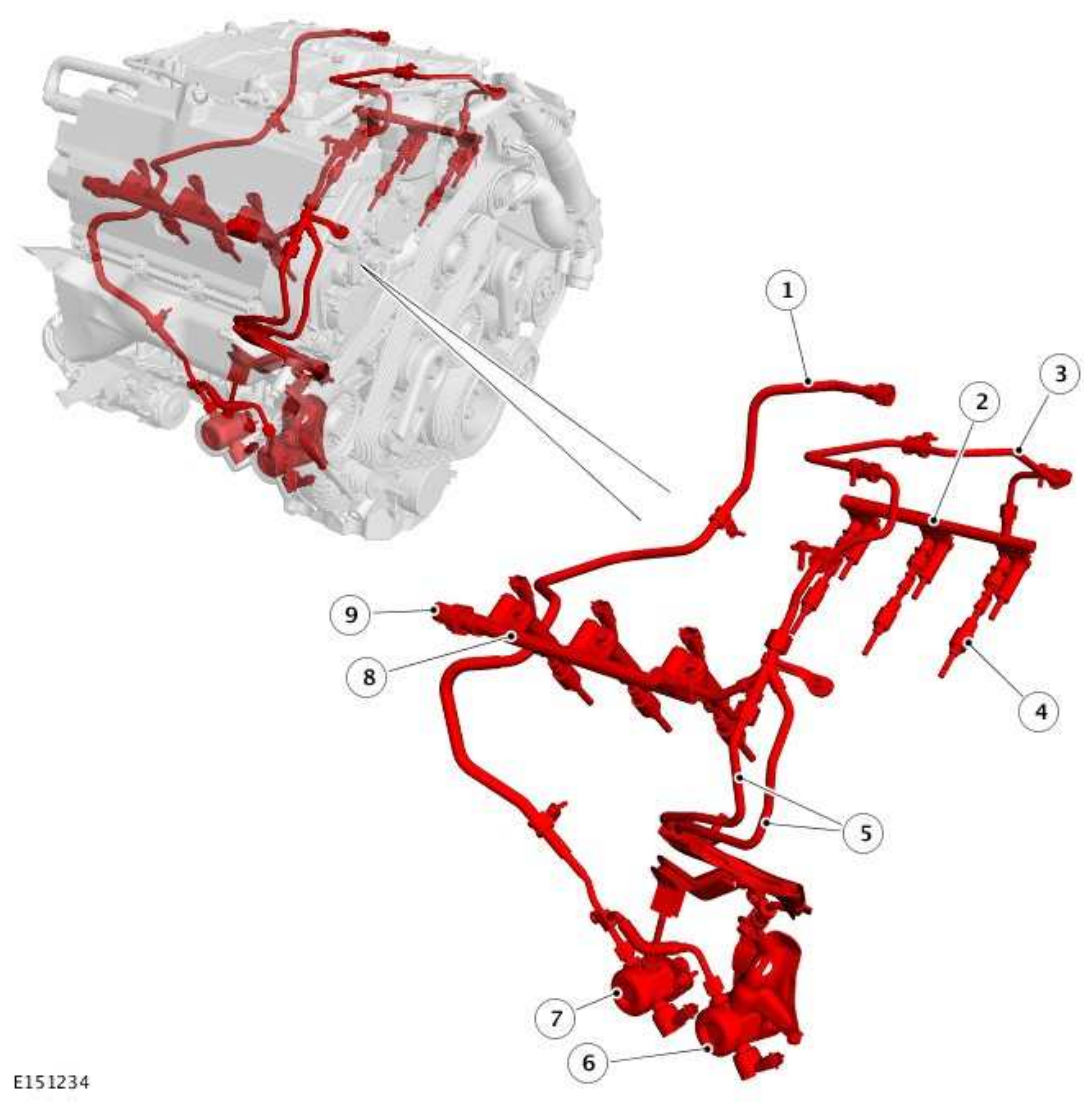
19. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

cardiagn.com

FUEL CHARGING AND CONTROLS - V6 S/C 3.0 L PETROL

DESCRIPTION AND OPERATION

COMPONENT LOCATION



ITEM	DESCRIPTION
1	Low Pressure (LP) Fuel Lines
2	Left Fuel Rail
3	Crossover Tube
4	Fuel Injector (6 Of)

cardiagn.com

5	High Pressure (HP) Fuel Lines
6	HP Fuel Pump - No.1 (Front)
7	HP fuel pump - No.2 (Rear)
8	Right Fuel Rail
9	Fuel Rail Pressure and Temperature (FRPT) Sensor

OVERVIEW

The fuel charging and controls system is a Direct Injection (DI) system controlled by the ECM (engine control module) .

The fuel charging and control system consists of:

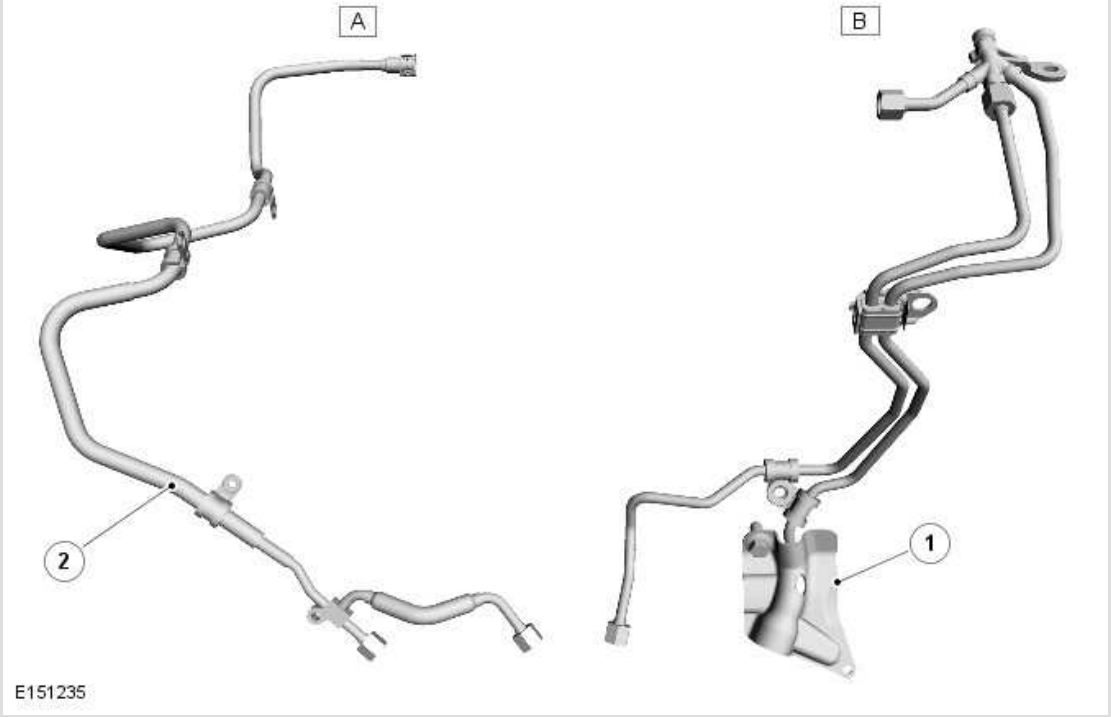
- Low Pressure (LP) and High Pressure (HP) Fuel Lines.
- Two HP Fuel Pumps.
- Two HP Fuel Rails and a Crossover Tube.
- A Fuel Rail Pressure and Temperature (FRPT) Sensor.
- Six Fuel Injectors.

LP fuel from the pump in the fuel tank is pressurized by the HP fuel pumps and supplied to the fuel injectors via the fuel rails and crossover tube. The ECM controls the fuel injectors and high pressure fuel pumps to inject the required volume of fuel into the combustion chambers.

COMPONENT DESCRIPTION

LOW AND HIGH PRESSURE LINES

cardiagn.com



ITEM	DESCRIPTION
A	Low Pressure (LP) Fuel Lines
B	High Pressure (HP) Fuel Lines
1	Pipe Cover
2	Heat Reflective and Insulation Sleeves

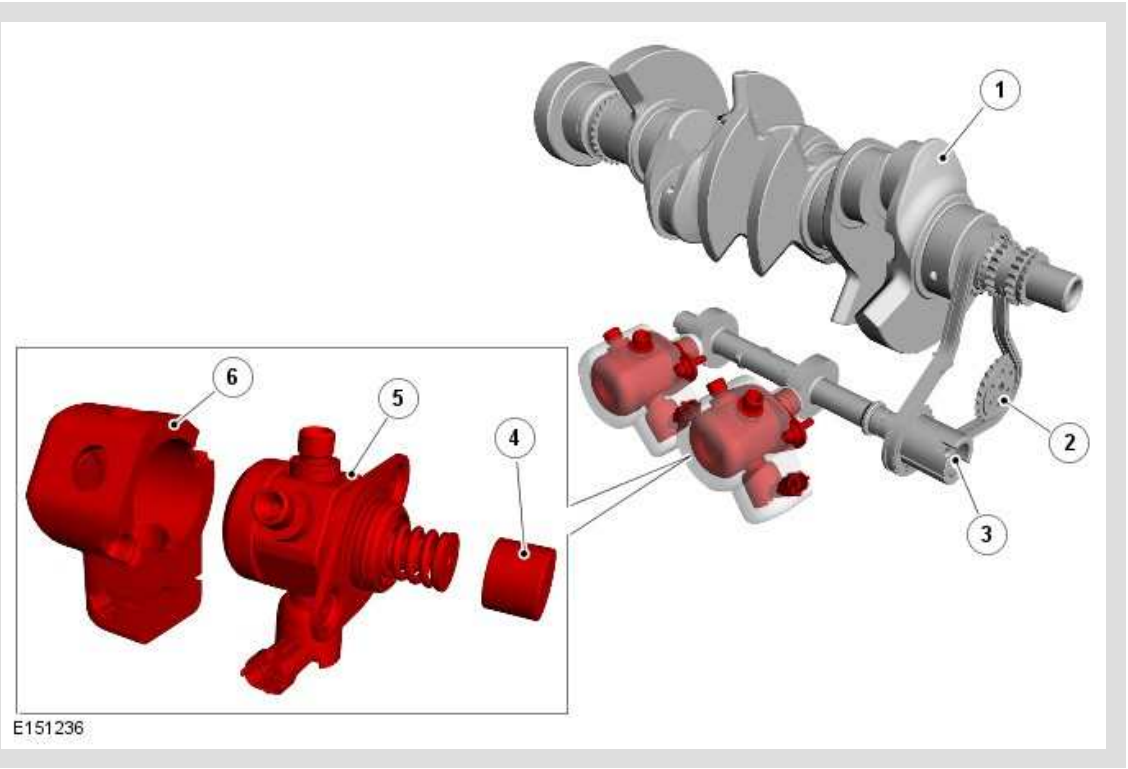
The low pressure fuel line connects the high pressure fuel pumps to the fuel delivery line from the fuel tank and lines system. A double latch quick release connector at the start of the LP fuel line connects with the fuel line from the fuel tank mounted fuel pump module. The connector is secured to a bracket on the charge air cooler. P-clips secure the LP fuel line to the rear of each cylinder head and to the

cardiagn.com

right side of the cylinder block. A heat reflective and insulation sleeve is installed on the LP fuel line where it runs behind the right exhaust manifold.

The HP fuel lines connect the HP fuel pumps to the right fuel rail and the crossover tube. Two P-clips and a pipe clamp attach the HP fuel lines to the cylinder block and the right cylinder head respectively. An integral bracket on the front HP fuel line is attached to a stud on the front-upper right camshaft cover. A pipe cover is installed on the bottom of the front HP fuel line and acoustic covers are fitted to both HP fuel lines.

HIGH PRESSURE FUEL PUMP



ITEM	DESCRIPTION
1	Crankshaft
2	Auxiliary Drive Chain
3	Auxiliary Shaft
4	Tappet
5	HP Fuel Pump - No.1
6	Acoustic Cover

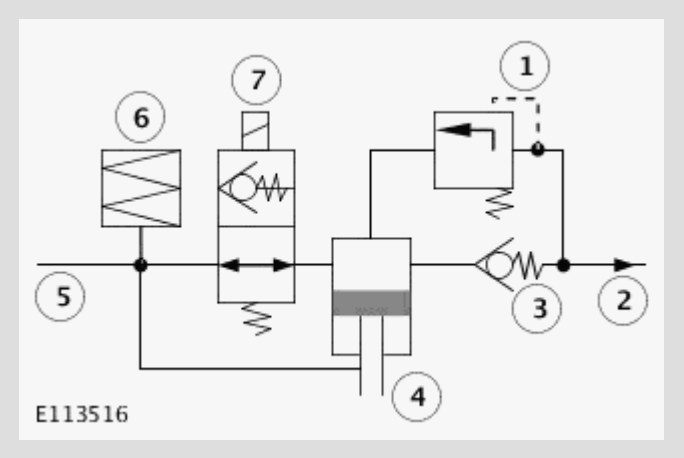
cardiagn.com

The two HP fuel pumps are identical mechanically-driven pumps installed on the right side of the oil pan body, behind the generator.

The front HP fuel pump is identified as No. 1 pump; the rear HP fuel pump is identified as No. 2 pump. An acoustic cover is installed on each of the HP fuel pumps.

The HP fuel pumps are single-plunger pumps. The plunger of each pump extends through the sump body and the carrier of the auxiliary shaft. A tappet on the end each plunger is operated by a two-lobe cam on the auxiliary shaft. A spring installed on the outside of the plunger ensures the plunger and tappet remain in contact with the cam.

The auxiliary shaft is driven by the crankshaft, via the auxiliary drive chain, at engine speed. The auxiliary shaft is timed to match the pump delivery strokes with crankshaft position.



ITEM	DESCRIPTION
1	Pressure Relief Valve (PRV)
2	To High Pressure Fuel Lines
3	Check Valve
4	Plunger
5	From Low Pressure Fuel Lines
6	Damper Chamber

cardiagn.com

7	Fuel Metering Valve

In addition to the plunger, each HP fuel pump contains:

- A Damper Chamber.
- A Fuel Metering Valve.
- A Check Valve.
- A Pressure Relief Valve.

The damper absorbs pressure pulses from the LP fuel system.

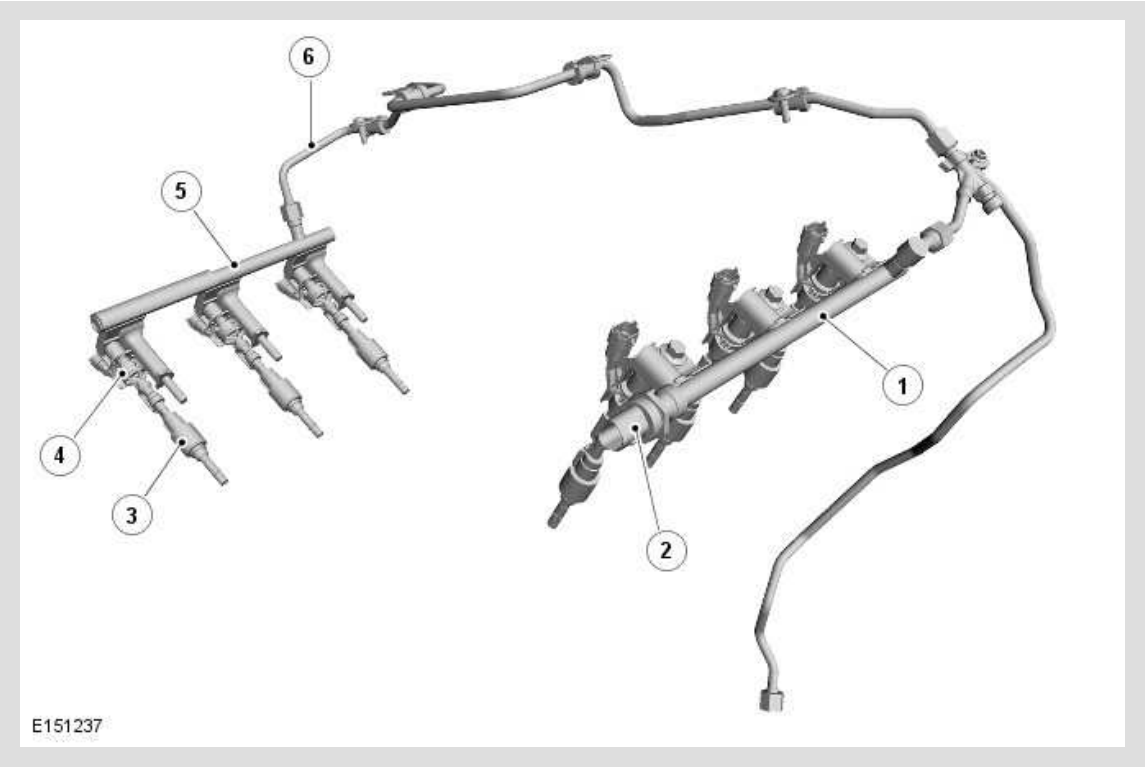
The fuel metering valve regulates the output pressure from the HP fuel pump. The fuel metering valve is a normally open solenoid valve controlled by the ECM . During the inlet stroke of the plunger the fuel metering valve is de-energized, which allows LP fuel into the pumping chamber. The ECM energizes the fuel metering valve closed during the delivery stroke of the plunger, which forces the fuel in the pumping chamber through the check valve into the HP lines. By changing the closing point of the fuel metering valve, the ECM can determine the volume of fuel output during the delivery stroke, and thus the pressure in the HP side of the system.

The check valve prevents the return of HP fuel to the pumping chamber during the inlet stroke of the plunger.

The PRV protects the HP side of the system from excessive pressure if there is a failure of the fuel metering valve. If the pump delivery pressure increases to 250 bar (3625 lbf/in2), the PRV opens and returns fuel to the inlet side of the plunger.

FUEL RAILS AND CROSSOVER TUBE

cardiagn.com



ITEM	DESCRIPTION
1	Right Fuel Rail
2	Fuel Rail Pressure and Temperature (FRPT) Sensor
3	Fuel Injector (6 Of)
4	Hold Down Spring (6 Of)
5	Left Fuel Rail
6	Crossover Tube

The fuel rails and crossover tube are made from stainless steel. Bolts attach each fuel rail to the related cylinder head. The crossover tube connects the front high pressure line to the left fuel rail, which ensures there is equal pressure in the two fuel rails. Four P-clips attach the crossover tube to the top of the charge air cooler.

cardiagn.com

The rear of the right fuel rail incorporates a threaded boss for installation of the fuel rail pressure and temperature (FRPT) sensor.

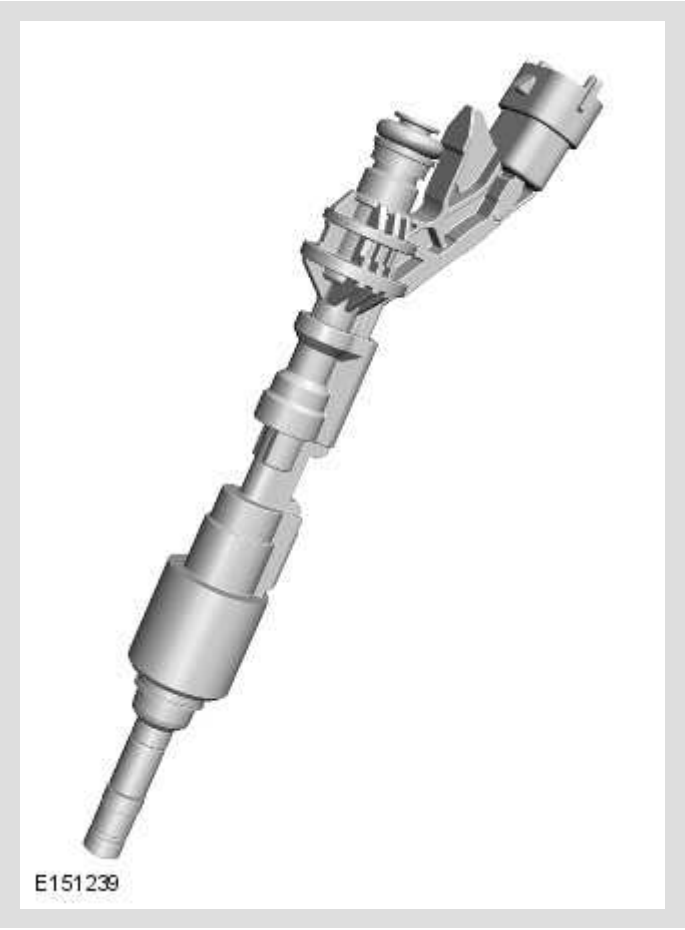
FUEL RAIL PRESSURE AND TEMPERATURE (FRPT) SENSOR

The FRPT sensor provides the ECM with a continuous signal of fuel rail pressure. The FRPT sensor is installed in the rear of the right fuel rail. The FRPT sensor is screwed into a threaded boss in the fuel rail.

The FRPT sensor contains a steel diaphragm fitted with strain gages, which are incorporated into a Wheatstone bridge. The output from the Wheatstone bridge is processed by the ECM to determine a pressure value and NTC (negative temperature coefficient) temperature.

FUEL INJECTORS

cardiagn.com



The fuel injectors spray fuel from the fuel rail directly into the combustion chambers. The fuel injectors are installed close to the center of the combustion chambers, between the inlet and exhaust valves and next to the spark plug.

The fuel injectors are a push fit in the fuel rails and the cylinder heads. On each fuel injector, an O-ring seal, seals the head of the

cardiagn.com

fuel injector in the fuel rail. A teflon ring seals the nozzle of the fuel injector in the cylinder head.

Each fuel injector contains a solenoid-operated needle valve, which opens when the solenoid winding is energized. While the needle valve is open, fuel is sprayed into the combustion chamber. The solenoid winding is connected to a power feed and a ground from the ECM , which operates the fuel injectors with a two stage power supply. Initially the ECM supplies the fuel injectors with 65 V, then once the boost current reaches 11 A the power supply is switched to battery voltage. The ECM meters the amount of fuel injected into the combustion chambers by adjusting the time that the solenoid winding is energized.

There are six holes around the tip of the nozzle through which the fuel is sprayed. Two of the holes direct fuel below the spark plug. The other four holes direct fuel evenly around the remainder of the combustion chamber.

If a fuel injector fails, the engine will suffer from unstable idle speed, poor NVH (noise, vibration and harshness) and poor emissions performance.

SYSTEM OPERATION

The ECM controls the output from the HP fuel pumps to deliver the required volume of fuel at pressures up to 200 bar (2900 lbf/in2).

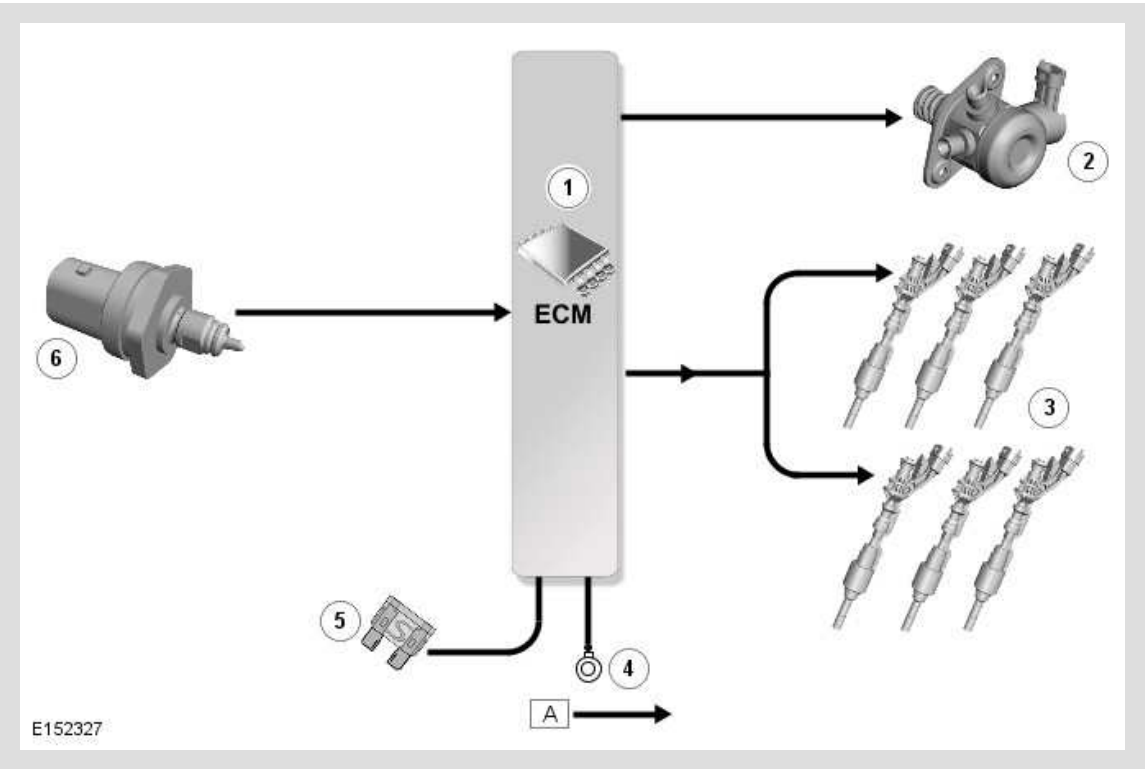
The ECM uses the signal from the Fuel Rail Pressure and Temperature (FRPT) sensor to calculate the time the fuel injectors need to be energized to deliver the correct mass of fuel to the combustion chambers.

INPUT AND OUTPUT CONTROL DIAGRAM

△ **NOTE:**

cardiagn.com

A = Hardwired



ITEM	DESCRIPTION
1	Engine Control Module (ECM)
2	High Pressure Fuel Pump (2 Of)
3	Fuel Injectors (6 Of)
4	Ground
5	Power Supply
6	Fuel Rail Pressure and Temperature (FRPT) Sensor

cardiagn.com

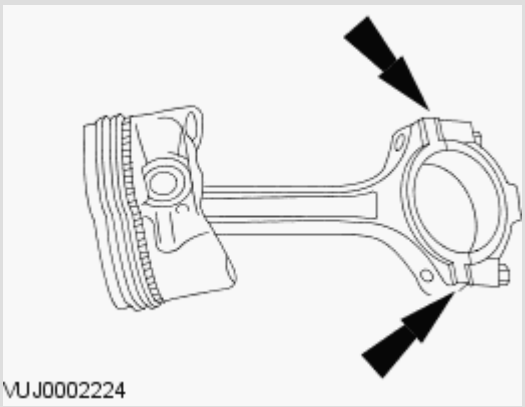
CONNECTING ROD CLEANING (G61251)

GENERAL PROCEDURES

1.

CAUTION:

Do not use a caustic cleaning solution or damage to connecting rods may occur.



Mark and separate the parts and clean with solvent. Clean the oil passages.

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

DIAGNOSIS AND TESTING

For additional information, refer to Diagnosis and Testing, Engine - V6 3.0 Petrol.
REFER to: Engine - V6 S/C 3.0L Petrol (303-00 Engine System - General Information, Diagnosis and Testing).

2015.0 F-TYPE (X152), 303-00

ENGINE SYSTEM - GENERAL INFORMATION

DIAGNOSIS AND TESTING

PRINCIPLES OF OPERATION

For a detailed description of the 3.0L engine, refer to the relevant Description and Operation section in the workshop manual. REFER to: Engine (303-01A Engine - V6 S/C 3.0L Petrol, Description and Operation).

INSPECTION AND VERIFICATION

cardiagn.com

CAUTION:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

NOTES:

- If a control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual, or determine if any prior approval programme is in operation, prior to the installation of a new module/component.
- When performing voltage or resistance tests, always use a digital multimeter accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the digital multimeter leads into account.
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

1. Verify the customer concern

1. Visually inspect for obvious signs of damage and system integrity

Visual Inspection

MECHANICAL	ELECTRICAL
■ Engine oil level ■ Coolant level ■ Fuel level ■ Oil leaks ■ Coolant leaks	■ Fuses ■ Wiring harnesses and connectors ■ Powertrain control module

cardiagn.com

■ Fuel leaks ■ Visibly damaged or worn parts ■ Loose or missing fixings ■ Fuel contamination/grade/quality	

1. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step

1. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index

1. Check DDW for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and carry out the recommendations as required

SYMPTOM CHART

SYMPTOM	POSSIBLE CAUSES	ACTION
Engine starting poor /difficult - Engine hot or cold	■ Engine system fault ■ Engine mechanical fault	■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index ■ Perform general engine checks: ■ Perform the Inline diagnostic unit 2, relative compression test - V6 3.0L S/C Petrol ■ Compression test. Refer to component tests in this section ■ Valve clearances ■ Spark plug condition and color
Engine idle poor	■ Engine system fault ■ Intake system leak	■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index

cardiagn.com

		■ Engine mechanical fault ■ Exhaust system restricted ■ Intake/fuel system fault	■ Check the intake system for leaks. Rectify as necessary ■ Perform general engine checks: ■ Perform the Inline diagnostic unit 2, relative compression test - V6 3.0L S/C Petrol ■ Compression test. Refer to component tests in this section ■ Valve clearances ■ Spark plug condition and color ■ Carry out a vacuum gauge check. Refer to component tests in this section ■ Check the exhaust system for restrictions or blockages. Rectify as necessary ■ Using the Jaguar Land Rover approved diagnostic equipment, check datalogger signals for long term and short term fuel trim ■ Readings up to 10%: may be considered as acceptable if the readings are equal bank to bank ■ Positive readings of between 10-20%: check for air leaks in air intake system ■ Negative readings of between 10-20%: check for over fuelling e.g. leaking injectors, high fuel pressure ■ Readings above 20%: check for DTCs and refer to DTC Index in section 100-00
Engine performance poor		■ Engine system fault ■ Intake system leak ■ Engine mechanical fault ■ Exhaust system restricted ■ Intake/fuel system fault	■ Using the Jaguar Land Rover approved diagnostic equipment, check the powertrain control module for related DTCs and refer to the relevant DTC index ■ Check the intake system for leaks. Rectify as necessary ■ Perform general engine checks: ■ Perform the Inline diagnostic unit 2, relative compression test - V6 3.0L S/C Petrol ■ Compression test. Refer to component tests in this section ■ Valve clearances ■ Spark plug condition and color ■ Carry out a vacuum gauge check. Refer to component tests in this section

cardiagn.com

		■ Check the exhaust system for restrictions or blockages. Rectify as necessary ■ Using the Jaguar Land Rover approved diagnostic equipment, check datalogger signals for long term and short term fuel trim ■ Readings up to 10%: may be considered as acceptable if the readings are equal bank to bank ■ Positive readings of between 10-20%: check for air leaks in air intake system ■ Negative readings of between 10-20%: check for over fuelling e.g. leaking injectors, high fuel pressure ■ Readings above 20%: check for DTCs and refer to DTC Index in section 100-00
Engine oil consumption excessive	■ Engine oil leak ■ Positive crankcase ventilation system leaking /blocked ■ Engine mechanical fault	■ Check for engine oil leaks. Rectify as necessary ■ Check the integrity of the positive crankcase ventilation system. Rectify as necessary ■ Perform an engine oil consumption test. Refer to the component tests in this section. If oil consumption is excessive, perform general engine checks: ■ Perform the Inline diagnostic unit 2, relative compression test - V6 3.0L S/C Petrol ■ Compression test. Refer to component tests in this section ■ Valve clearances ■ Spark plug condition and color ■ Carry out a vacuum gauge check. Refer to component tests in this section

COMPONENT TEST - ENGINE OIL LEAKS

TEST PROCEDURE - FLUORESCENT OIL ADDITIVE METHOD

cardiagn.com

NOTE:

Before installing new gaskets or oil seals, ensure that the source of the leak is clearly established.

If the oil leak cannot be identified clearly by a visual inspection, perform an Ultraviolet test:

1. Clean the engine with a suitable cleaning fluid (for example, brake cleaner).

1. Drain the engine oil and refill with recommended oil, premixed with Engine Oil Dye or equivalent. Use a minimum 14.8 ml (0.5 ounce) to a maximum 29.6 ml (1 ounce) of fluorescent additive to all engines. If oil is not premixed, fluorescent additive must first be added to the crankcase.

1. Run engine for 15 minutes. Stop the engine and inspect all seal and gasket areas for leaks using a 12 Volt Master UV Diagnostic Inspection Kit or equivalent. A clear bright yellow or orange area will identify leak. For extremely small leaks, several hours may be required for the leak to appear.

1. As necessary, pressurize the main oil gallery system to locate leaks due to incorrectly sealed, loose or cocked plugs. If the flywheel bolts leak oil, look for sealer on the threads.

1. Repair all leaks as necessary.

COMPONENT TEST - CYLINDER COMPRESSION TEST

GENERAL REMARKS

cardiagn.com

NOTES:

- Removing fuses and disconnecting electrical connectors may cause the DTCs to set. After completing the compression test, clear DTCs using the Jaguar Land Rover approved diagnostic equipment.
- The valve clearances must be set to the prescribed values in order to achieve accurate results during the compression test.

The compression test should be performed with the engine at normal operating temperature.

TEST PROCEDURE

WARNING:

Failure to follow this instruction may result in personal injury.

1. Set the transmission to Park (automatic transmission) or Neutral (manual transmission).
1. Remove the fuel pump relay.
1. Start the engine - the engine will start, run for a few seconds then stall.
1. Remove the spark plugs.
1. Install the compression tester.
1. Install an auxiliary starter switch in the starting circuit. With the ignition switch OFF, using the auxiliary starter switch, crank the engine a minimum of five compression strokes and record the highest reading. Note the approximate number of compression strokes required to obtain the highest reading.

cardiagn.com

1. Repeat the test on each cylinder, cranking the engine approximately the same number of compression strokes.

1. Install the removed components in reverse order, observing the specified tightening torques.

1. Clear DTCs.

INTERPRETATION OF RESULTS

> **NOTE:**
>
> Due to the possibility of loose carbon that has become trapped between the valve face and seat effecting the pressure readings, when carrying out a compression test and cylinders are found to have low pressures, install the spark plugs, road test the vehicle and re-test the suspect cylinders. If the correct pressures are restored, no further action is required.

The minimum cylinder compression reading recorded must be within 10% of the maximum cylinder compression reading recorded.

If the cylinder pressures are found to be low, carry out a leakdown test to determine the location of the fault (if any leakback can be heard through the engine breather system suspect the piston rings, if any leakback can be heard through the inlet system suspect the inlet valve or seat, if any leakback can be heard through the exhaust manifold suspect the exhaust valve or seat. If the measurements for two cylinders next to each other are both too low then it is very likely that the cylinder head gasket between them is burnt through. This can also be recognized by traces of engine oil in the coolant and/or coolant in the engine oil).

COMPONENT TEST - OIL CONSUMPTION TEST

GENERAL REMARKS

cardiagn.com

The amount of oil an engine uses will vary with the way the vehicle is driven in addition to normal engine-to-engine variation. This is especially true during the first 16,100 km (10,000 miles) when a new engine is being broken in or until certain internal components become conditioned. Vehicles used in heavy-duty operation may use more oil. The following are examples of heavy-duty operation:

- Trailer towing applications
- Severe loading applications
- Sustained high speed operation

Engines need oil to lubricate the following internal components:

- Cylinder block cylinder walls
- Pistons and piston rings
- Intake and exhaust valve stems
- Intake and exhaust valve guides
- All internal engine components

When the pistons move downward, a thin film of oil is left on the cylinder walls. As the vehicle is operated, some oil is also drawn into the combustion chambers past the intake and exhaust valve stem seals and burned.

The following are examples of conditions that can affect oil consumption rates:

- Engine size
- Operator driving habits
- Ambient temperatures
- Quality and viscosity of oil

cardiagn.com

- Engine is being run in an overfilled condition (check the oil level at least five minutes after a hot shutdown with the vehicle parked on a level surface. The oil level should not be above the top of the cross-hatched area and the letter "F" in FULL).

Operation under varying conditions can frequently be misleading. A vehicle that has been run for several thousand miles on short trips or in below-freezing ambient temperatures may have consumed a "normal" amount of oil. However, when checking the engine oil level, it may measure up to the full mark on the oil level indicator due to dilution (condensation and fuel) in the engine crankcase. The vehicle then might be driven at high speeds on the highway where the condensation and fuel boil off. The next time the engine oil is checked it may appear that a liter of oil was used in about 160 km (100 miles). Oil consumption rate is about one liter per 2,400 km (1,500 miles).

Make sure the selected engine oil meets Jaguar specification and the recommended API Performance category "SG" and SAE viscosity grade as shown in the vehicle Owner's Guide. It is also important that the engine oil is changed at the intervals specified for the typical operating conditions.

TEST PROCEDURE

The following diagnostic procedure is used to determine the source of excessive oil consumption.

NOTE:

Oil use is normally greater during the first 16,100 km (10,000 miles) of service. As mileage increases, oil use decreases. High speed driving, towing, high ambient temperature and other factors may result in greater oil use.

1. Define excessive consumption, such as the number of miles driven per liter of oil used. Also determine customers driving

cardiagn.com

habits, such as sustained high speed operation, towing, extended idle and other considerations.

1. Verify that the engine has no external oil leaks as described under Engine Oil Leaks in this section.

1. Carry out an oil consumption test:
   - Run the engine to normal operating temperature. Switch engine OFF and allow oil to drain back for at least five minutes .
   - With vehicle parked on level surface, check the engine oil level.
   - If required, add engine oil to set level exactly to the FULL mark.
   - Record the vehicle mileage.
   - Instruct the customer to return for a level check after driving the vehicle as usual for 1,610 km (1000 miles).
   - Check the oil level under the same conditions and at the same location as the initial check.

NOTE:

If the oil consumption rate is unacceptable go to Step 4.

1. Check the Positive Crankcase Ventilation (PCV) system. Make sure the system is not plugged.

1. Check for plugged oil drain-back holes in the cylinder head and cylinder block.

1. If the condition still exists after carrying out the above tests go to step 9.

1. Carry out a cylinder compression test. Refer to the Cylinder Compression Test procedure in this section. This can help

cardiagn.com

determine the source of oil consumption such as valves, piston rings or other areas.

1. Check valve guides for excessive guide clearance. Install new valve stem seals after verifying valve guide clearance.

1. Worn or damaged internal engine components can cause excessive oil consumption. Small deposits of oil on the tips of the spark plugs can be a clue to internal oil consumption.

COMPONENT TEST - INTAKE MANIFOLD VACUUM TEST

TEST PROCEDURE

Bring the engine to normal operating temperature. Connect a vacuum gauge or equivalent to the intake manifold. Run the engine at the specified idle speed.

The vacuum gauge should read between 51-74 kPa (15-22 in-Hg) depending upon the engine condition and the altitude at which the test is performed. Subtract 4.0193 kPa (1 in-Hg) from the specified reading for every 304.8 m (1,000 feet) of elevation above sea level.

The reading should be steady. As necessary, adjust the gauge damper control (where used) if the needle is fluttering rapidly. Adjust damper until needle moves easily without excessive flutter.

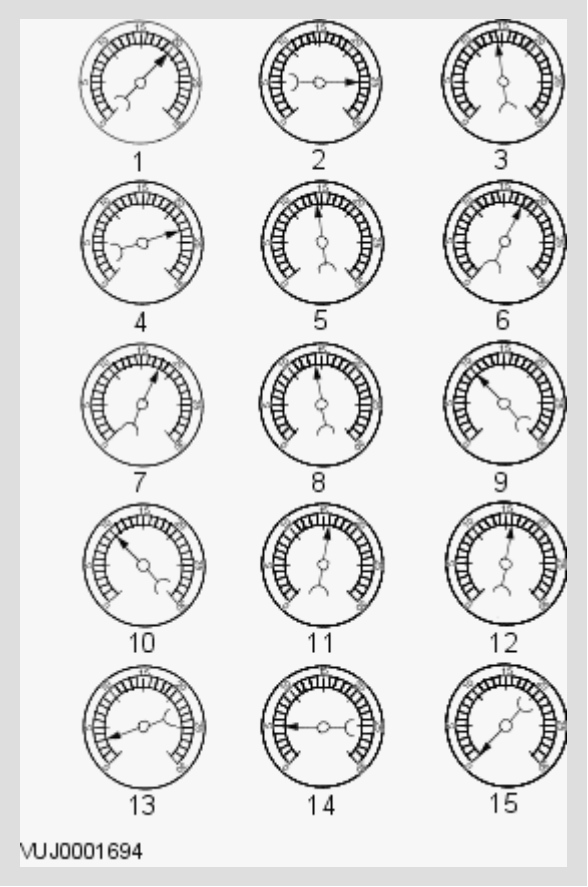
INTERPRETATION OF RESULTS

A careful study of the vacuum gauge reading while the engine is idling will help pinpoint trouble areas. Always conduct other appropriate tests before arriving at a final diagnostic decision. Vacuum gauge readings, although helpful, must be interpreted carefully.

Most vacuum gauges have a normal band indicated on the gauge face.

The following are potential gauge readings. Some are normal; others should be investigated further.

cardiagn.com



1. NORMAL READING: Needle between 51-74 kPa (15-22 in-Hg) and holding steady.

1. NORMAL READING DURING RAPID ACCELERATION: When the engine is rapidly accelerated, the needle will drop to a low (not to zero) reading. When the throttle is suddenly released, the needle will snap back up to a higher than normal figure.

1. NORMAL FOR HIGH-LIFT CAMSHAFT WITH LARGE OVERLAP: The needle will register as low as 51 kPa (15 in-Hg) but will be relatively steady. Some oscillation is normal.

1. WORN RINGS OR DILUTED OIL: When the engine is accelerated, the needle drops to 0 kPa (0 in-Hg). Upon deceleration, the needle runs slightly above 74 kPa (22 in-Hg).

1. STICKING VALVES: When the needle remains steady at a normal vacuum but occasionally flicks (sharp, fast movement) down and back about 13 kPa (4 in-Hg), one or more valves may be sticking.

cardiagn.com

1. BURNED OR BENT VALVES: A regular, evenly-spaced, downscale flicking of the needle indicates one or more burned or damaged valves. Insufficient hydraulic valve tappet or hydraulic lash adjuster clearance will also cause this reaction.

1. POOR VALVE SEATING: A small but regular downscale flicking can mean one or more valves are not seating correctly.

1. WORN VALVE GUIDES: When the needle oscillates over about a 13 kPa (4 in-Hg) range at idle speed, the valve guides could be worn. As engine speed increases, the needle will become steady if guides are responsible.

1. WEAK VALVE SPRINGS: When the needle oscillation becomes more violent as engine RPM is increased, weak valve springs are indicated. The reading at idle could be relatively steady.

1. LATE VALVE TIMING: A steady but low reading could be caused by late valve timing.

1. IGNITION TIMING RETARDED: Retarded ignition timing will produce a steady but somewhat low reading.

1. INSUFFICIENT SPARK PLUG GAP: When spark plugs are gapped too close, a regular, small pulsation of the needle can occur.

1. INTAKE LEAK: A low, steady reading can be caused by an intake manifold or throttle body gasket leak.

1. BLOWN HEAD GASKET: A regular drop of fair magnitude can be caused by a blown head gasket or warped cylinder head to cylinder block surface.

1. RESTRICTED EXHAUST SYSTEM: When the engine is first started and is idled, the reading may be normal, but as the engine RPM is increased, the back pressure caused by a clogged muffler, kinked tail pipe or other concerns will cause the needle to slowly

cardiagn.com

drop to 0 kPa (0 in-Hg). The needle then may slowly rise. Excessive exhaust clogging will cause the needle to drop to a low point even if the engine is only idling.

When vacuum leaks are indicated, search out and correct the cause. Excess air leaking into the system will upset the fuel mixture and cause concerns such as rough idle, missing on acceleration or burned valves. If the leak exists in an accessory such as the power brake booster, the unit will not function correctly. Always repair vacuum leaks.

COMPONENT TEST - ENGINE OIL PRESSURE CHECK

TEST PROCEDURE

NOTE:

Prior to checking the engine oil pressure, a road test of 6 miles (10 kilometres), must be carried out. Do not attempt to attain engine normal operating temperature by allowing the engine to idle.

1. Disconnect the battery ground cable

WARNINGS:

- The spilling of hot engine oil is unavoidable during this procedure, care must be taken to prevent scalding.
- Wear protective gloves.

1. Remove the engine oil filter element.

NOTE:

cardiagn.com

Ensure the oil filter element is not contaminated during this procedure

1. Install the oil filter element into special tool (Oil filter adapter number 303-1451)

1. Install the special tool (Oil filter adapter number 303-1451) to the engine. Torque: 25 Nm

1. Install the special tool (Oil pressure testing gauge, 303-871) and tighten the union

1. Connect the battery ground cable

1. Refer to owner hand book, check and top-up the engine oil if required

1. Start and run the engine

1. Note the oil pressure readings with the engine running at idle and 3500 RPM

1. Turn off the engine

1. Disconnect the battery ground cable

cardiagn.com

1. Remove the special tools
    1. Clean the components

1. Install the engine oil filter element

> **NOTE:**
>
> Ensure the oil filter element is not contaminated during this procedure

1. Connect the battery ground cable

1. Refer to owner hand book, check and top-up the engine oil if required

DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00. REFER to: Diagnostic Trouble Code (DTC) Index - V6 S/C 3.0L Petrol , DTC: Engine Control Module (ECM) (100-00 General Information, Description and Operation).

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

CAMSHAFT LH (G1584100)

REMOVAL AND INSTALLATION

12.13.01	CAMSHAFT - ENGINE SET - RENEW	3000 CC, AJ V6 (AJ126)	20.1	USED WITHINS	
12.13.19	CAMSHAFT - BANK 2 SET - RENEW	3000 CC, AJ V6 (AJ126)	17.8	USED WITHINS	

REMOVAL

CAUTION:

Make sure that the orientation and code on the top of the camshaft bearing caps is noted (along with the bank - A or B), so that on installation the components are installed to their original position. Failure to follow this instruction may cause damage to the vehicle.

cardiagn.com

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

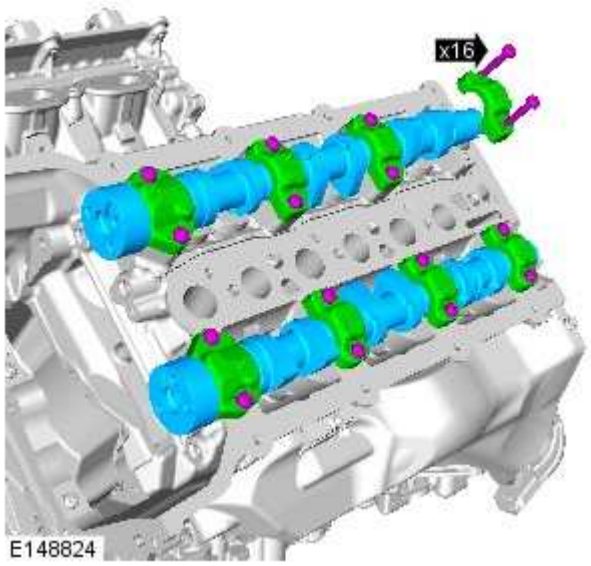
4. **CAUTIONS:**

   - Rotate the camshafts until all the valves are at their minimum open point.
   - Evenly and progressively, release the camshaft bearing caps.

cardiagn.com

NOTE:

Remove the camshaft bearing caps. Note: their position, orientation and markings. Each is marked with its position (number) and an orientation (arrow).



INSTALLATION

1.

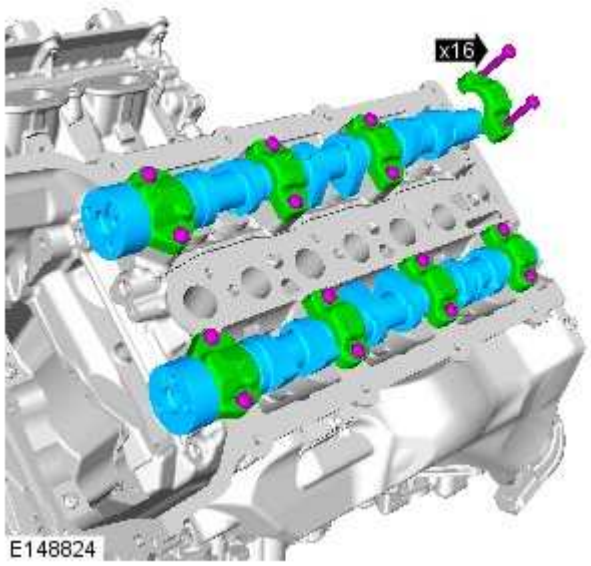
CAUTIONS:

- Prior to installing the camshafts, position the crankshaft 45 degrees ATDC cylinder 1A to prevent valve/piston collision.
- Make sure that the camshafts and camshaft bearing caps are installed in their original locations.
- Evenly and progressively install and tighten the camshaft bearing caps.

cardiagn.com

NOTE:

Lubricate the camshafts and the camshaft bearing caps with EP90 oil (or 75/90 viscosity oil will suffice) prior to installation.



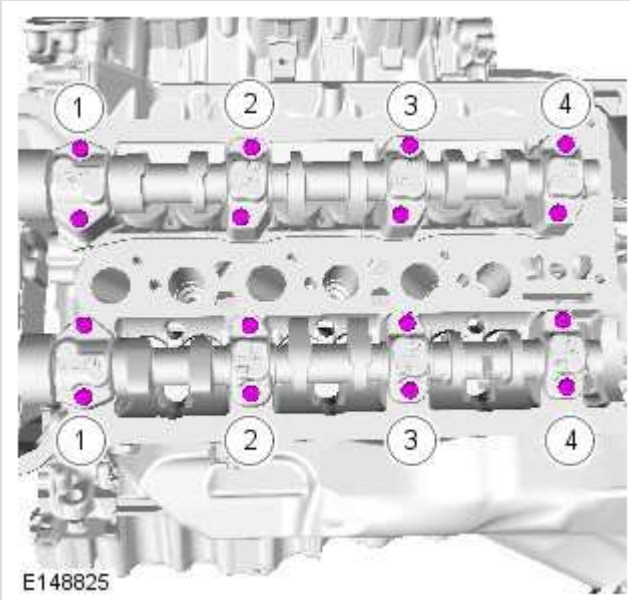
Torque: **3 Nm**

2.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com



Torque: **12 Nm**

3.

CAUTION:

Only rotate the crankshaft clockwise.

Rotate the crankshaft untill the camshaft lobe on the valve being checked is 180 degrees from the maximum opening position.

4.

cardiagn.com

NOTE:

If the valve clearance is incorrect, continue to the next step. If the valve clearance is correct, continue to step 8.

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

5. **CAUTIONS:**

- Do not use a magnet to remove the tappet.
- Use the following formula to calculate the required bucket thickness. Original thickness + measured clearance - desired clearance = required bucket thickness.

Remove the tappet and measure the thickness.

6. **NOTE:**

If a new tappet is installed then go back to step 1 of the install procedure.

Install a new tappet if required.

7. Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

8. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

9. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

TIMING DRIVE COMPONENTS (G1584118)

REMOVAL AND INSTALLATION

12.65.13	TIMING CHAINS, GEARS AND TENSIONERS - ENGINE SET - RENEW	3000 CC, AJ V6 (AJ126)	15.6	USED WITHINS	

SPECIAL TOOL(S)

303-1445

Timing Tool – Camshaft Alignment

cardiagn.com

303-1452

Camshaft Rotating Tool

303-1482

Tensioner Tool

JLR-303-1303

Timing Tool

cardiagn.com

E152576	**JLR-303-1304** Locking Tool

REMOVAL

CAUTION:

Check all timing components for wear and install new components if required.

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2.

WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

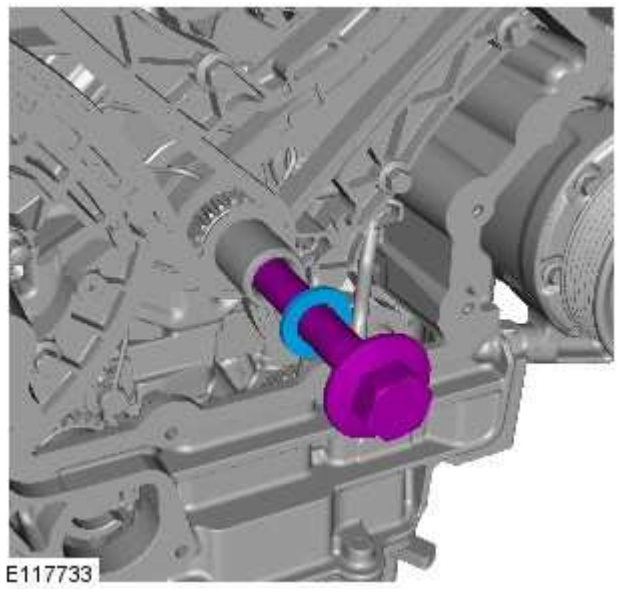
3. Remove the starter motor.
Refer to: Starter Motor (303-06A, Removal and Installation).
Refer to: Starter Motor (303-06B, Removal and Installation).

4. Remove the timing cover.
Refer to: Timing Cover (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

5.

CAUTION:

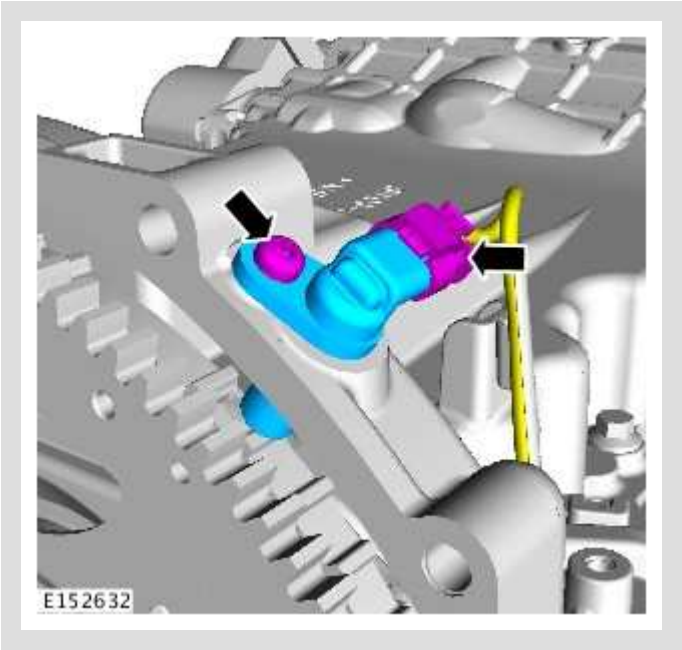
An M16 washer must be used to prevent damage to the crankshaft on installation.



Install the crankshaft pulley bolt.
Torque: **20 Nm**

6.

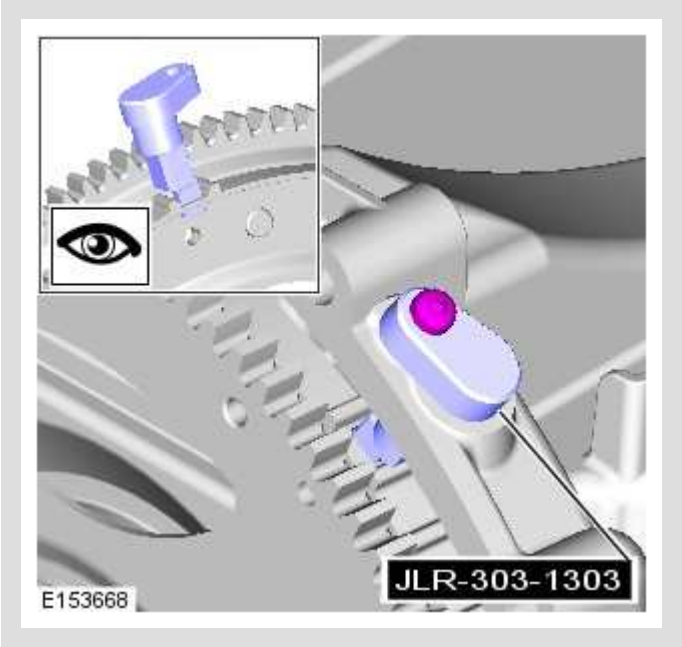
cardiagn.com



7.

CAUTION:

Only rotate the crankshaft clockwise.

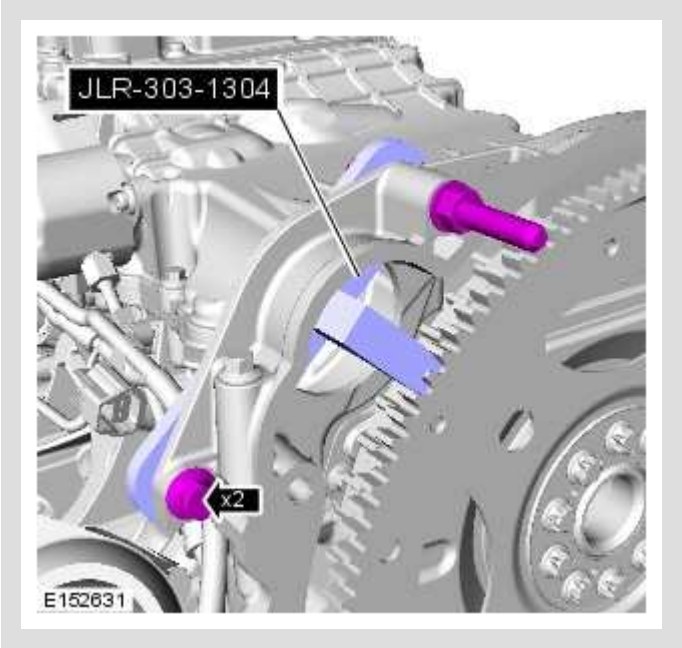


Install the special tool.

Special Tool(s): JLR-303-1303

8.

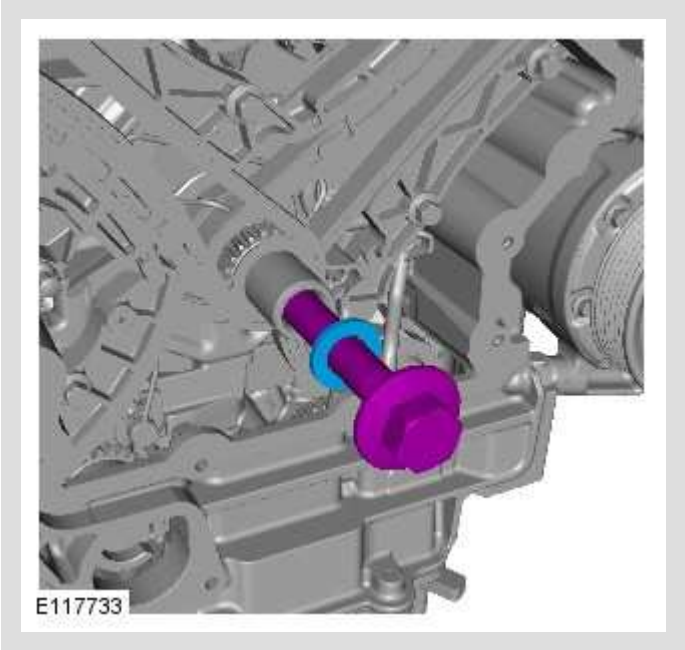
cardiagn.com



Install the special tool.

Special Tool(s): JLR-303-1304

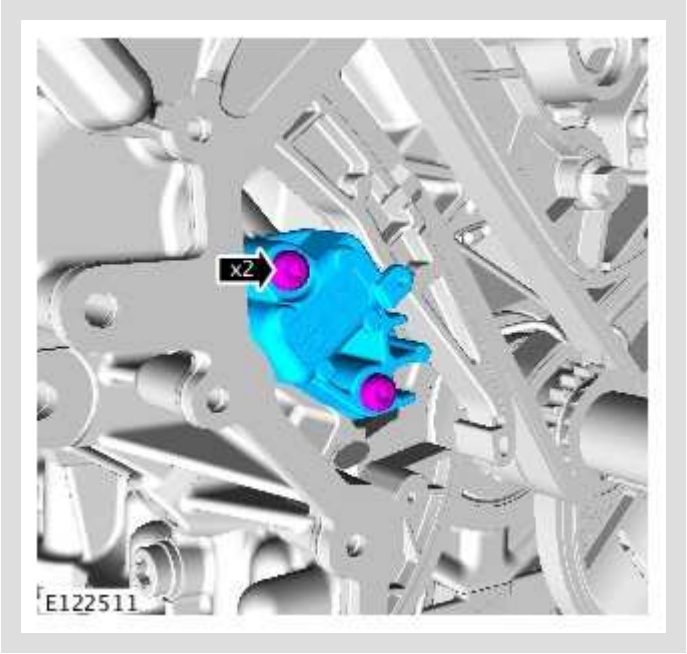
9.



Remove the crankshaft pulley bolt.

10.

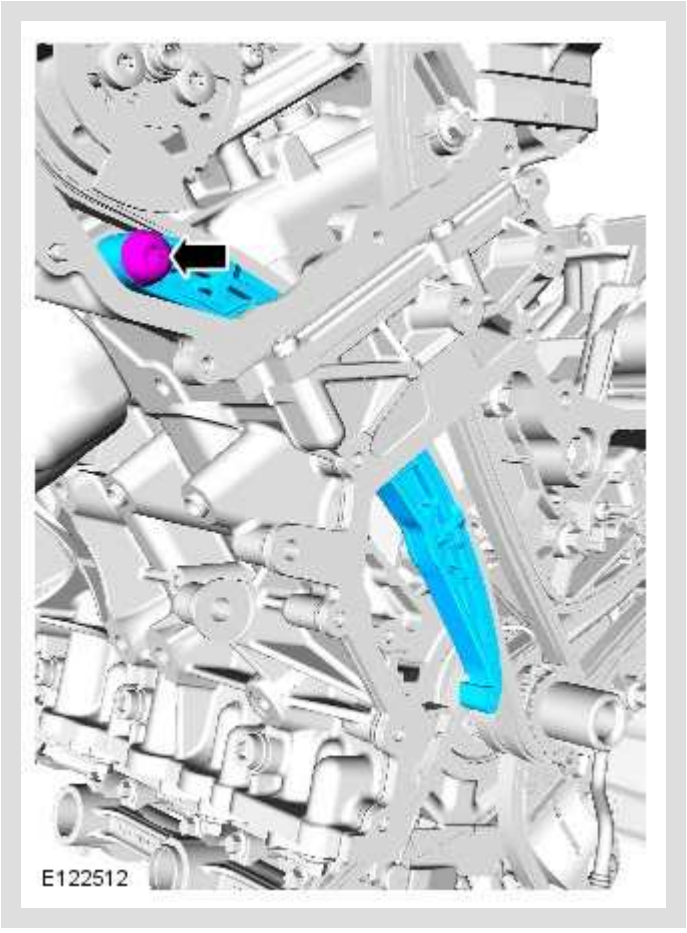
cardiagn.com



Remove the timing chain tensioner.

11.

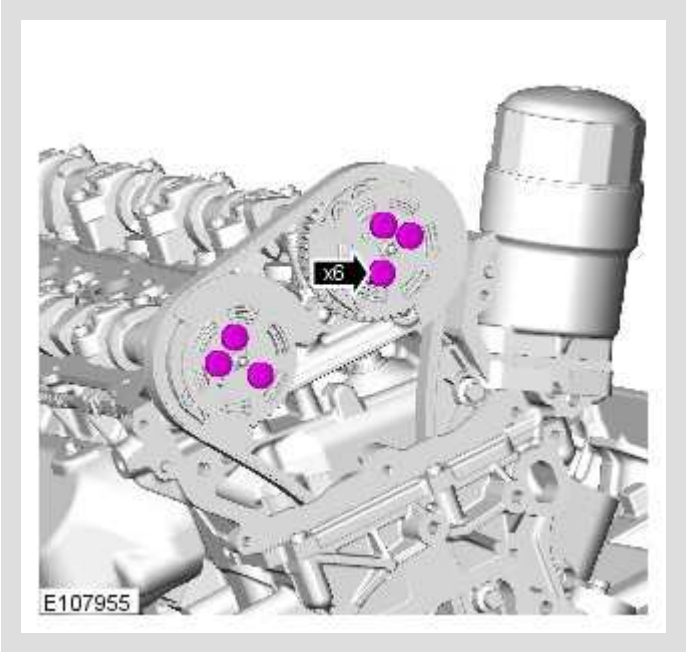
cardiagn.com



Remove the timing chain guide.

12.

cardiagn.com



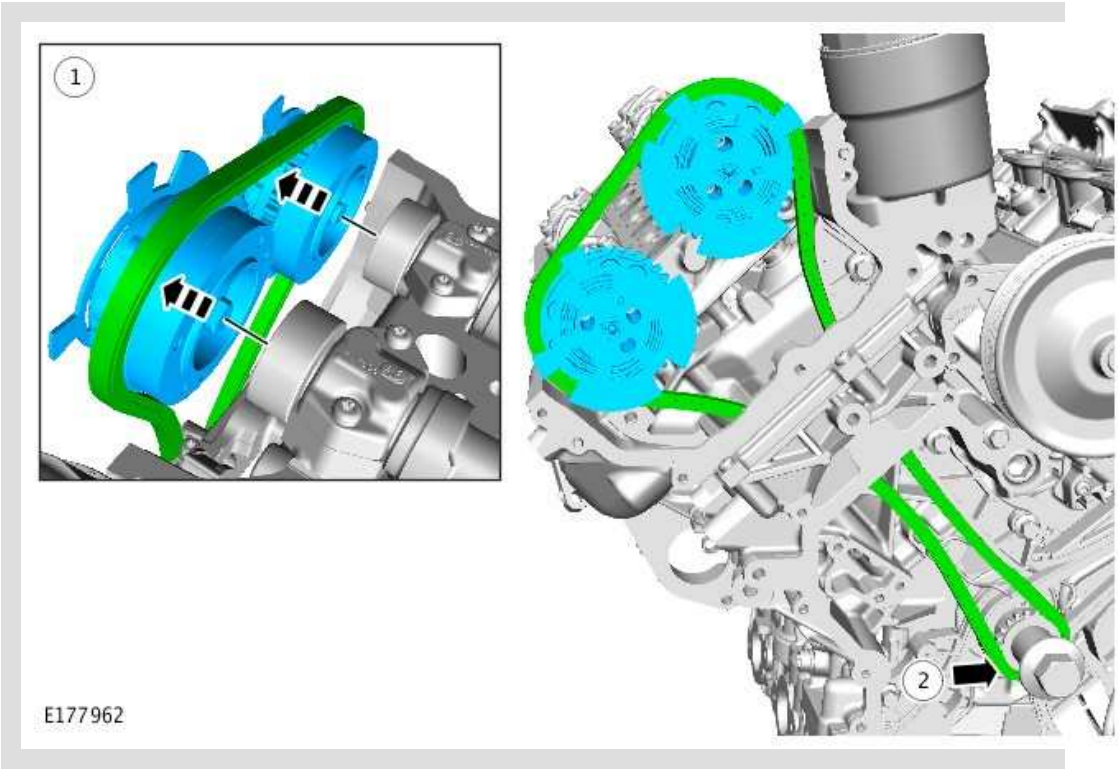
Remove the variable valve timing (VVT) unit bolts.

13.

CAUTION:

If the variable valve timing (VVT) units are knocked or dropped then new VVT(s) must be installed.

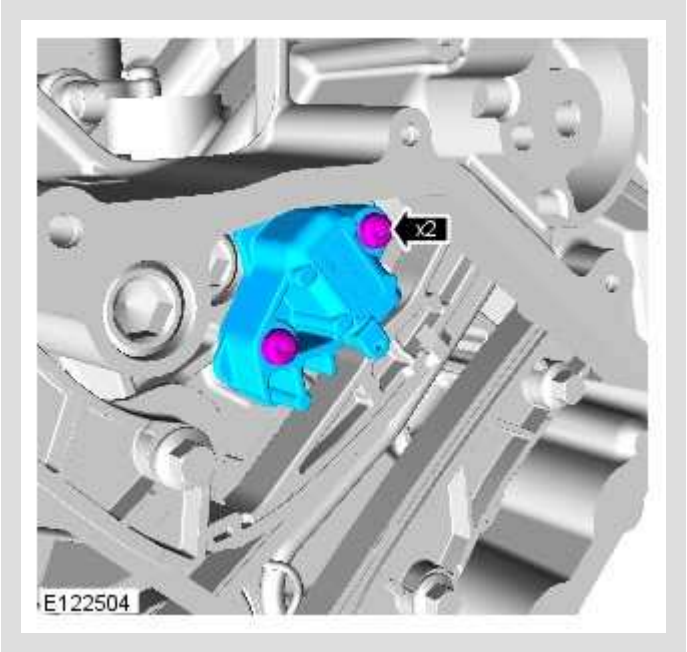
cardiagn.com



Remove the timing chain and VVT units.

14.

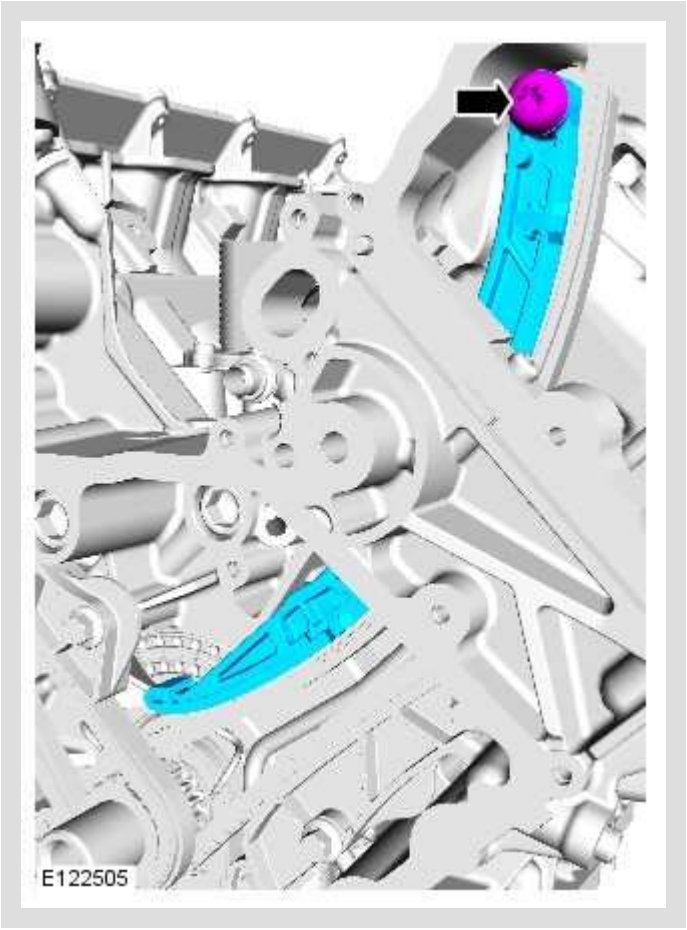
cardiagn.com



Remove the timing chain tensioner.

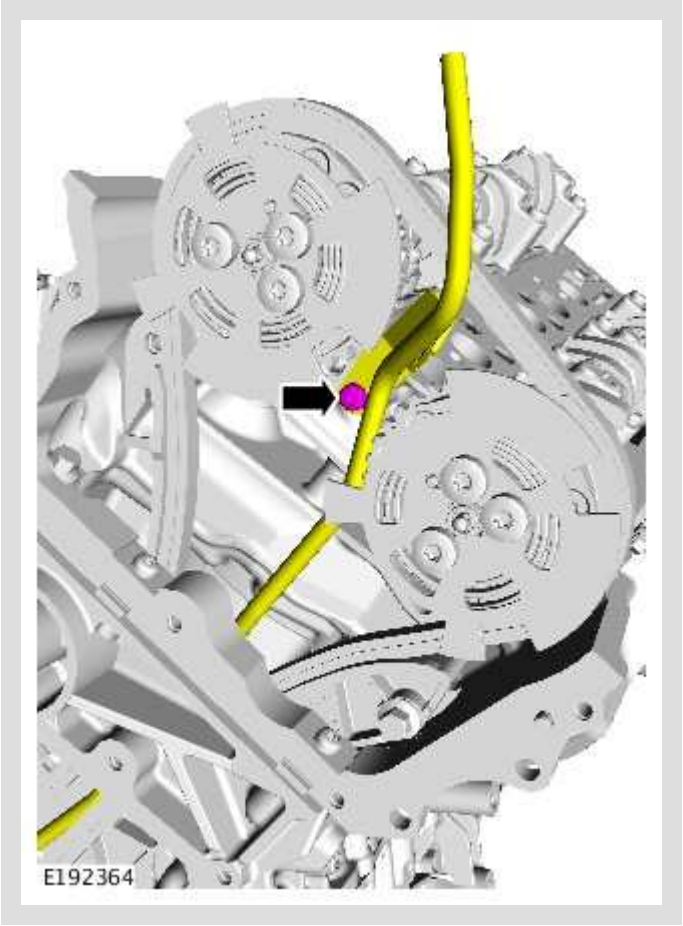
15.

cardiagn.com



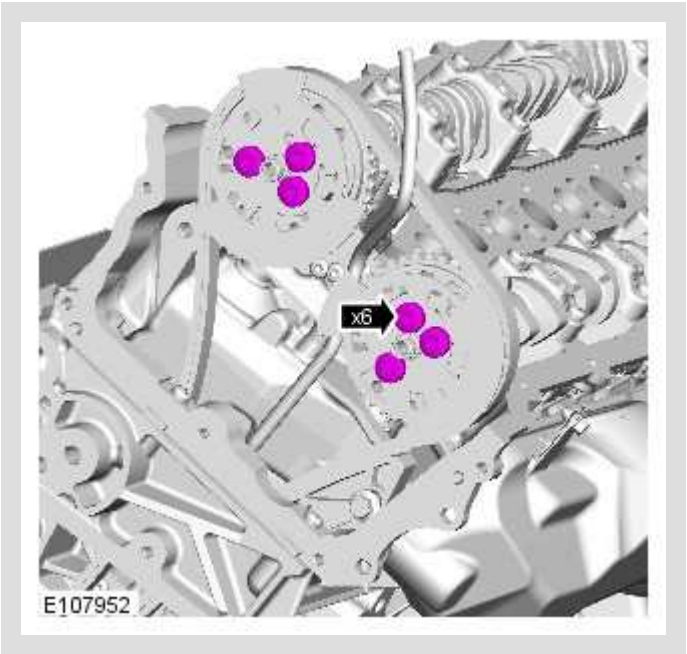
Remove the timing chain guide.

cardiagn.com



Release the oil drain tube.

17.



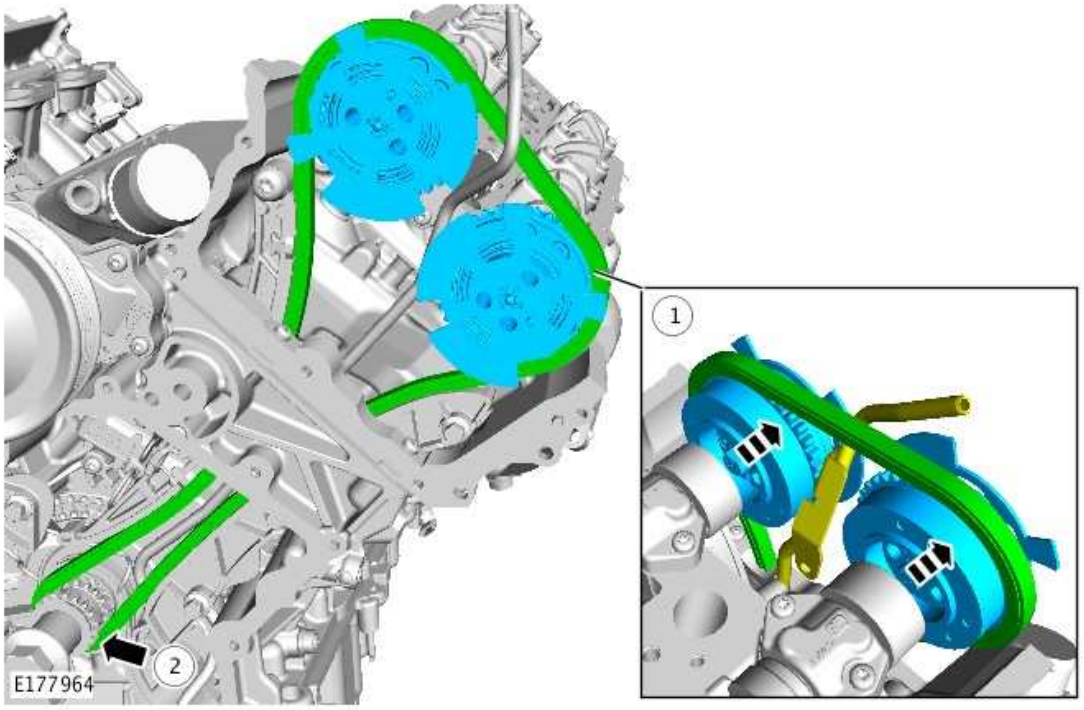
Remove the variable valve timing (VVT) unit bolts.

18.

cardiagn.com

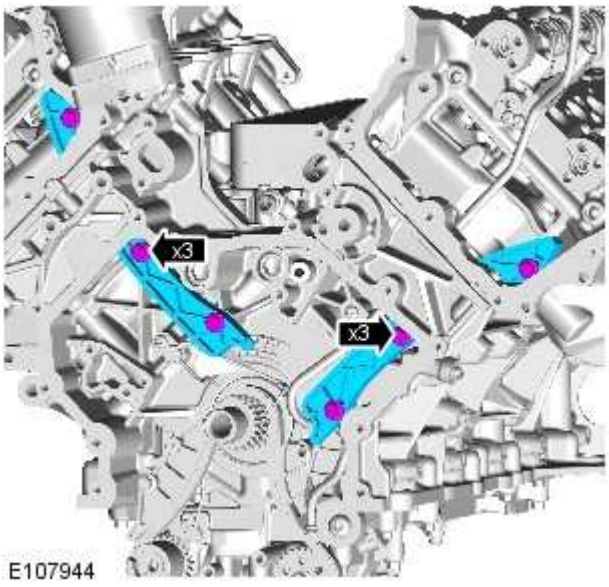
CAUTION:

If the VVT is knocked or dropped then new VVT(s) must be installed.



Remove the timing chain with the VVT units.

19.

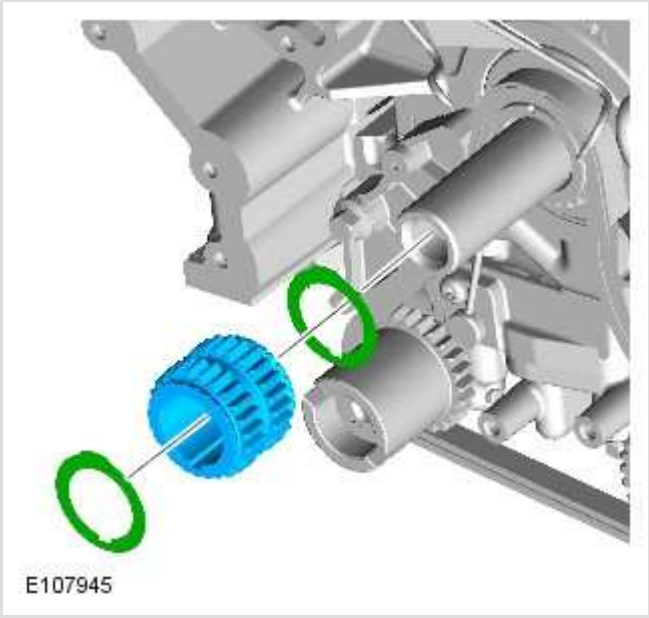


20.

cardiagn.com

CAUTION:

Discard the friction washer.



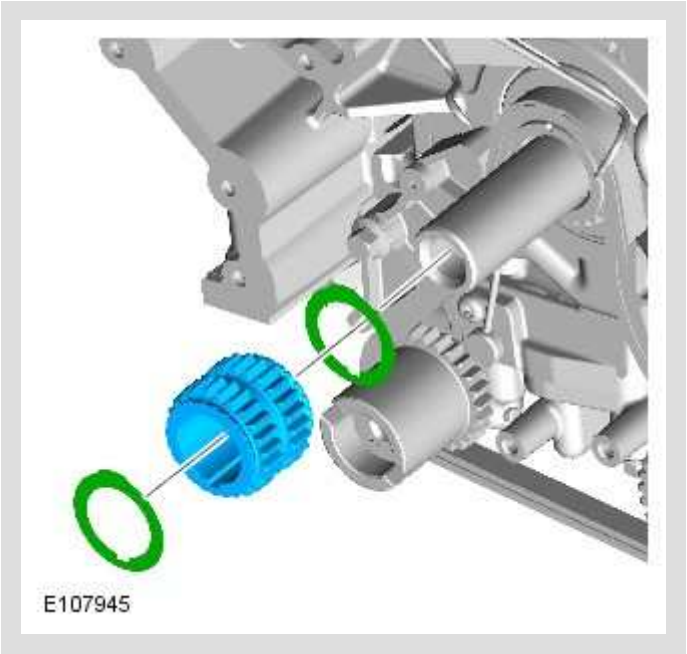
INSTALLATION

1.

CAUTION:

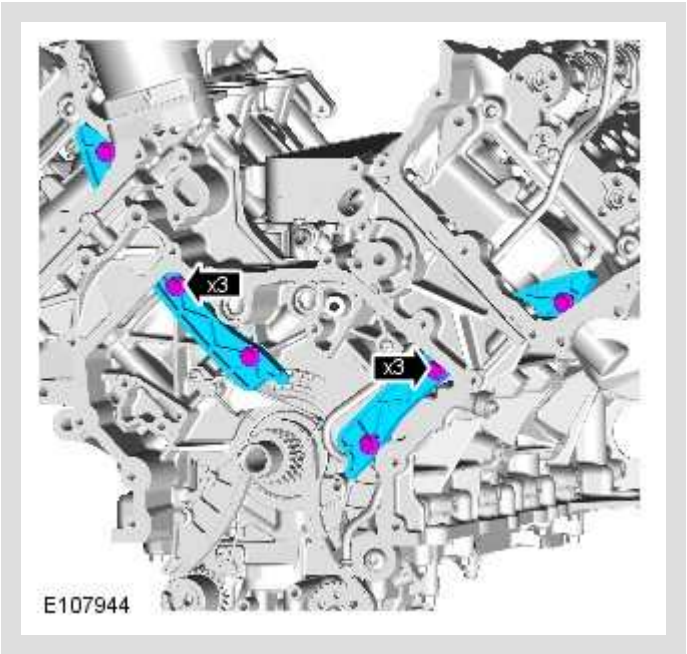
Install a new friction washer.

cardiagn.com



2.

cardiagn.com

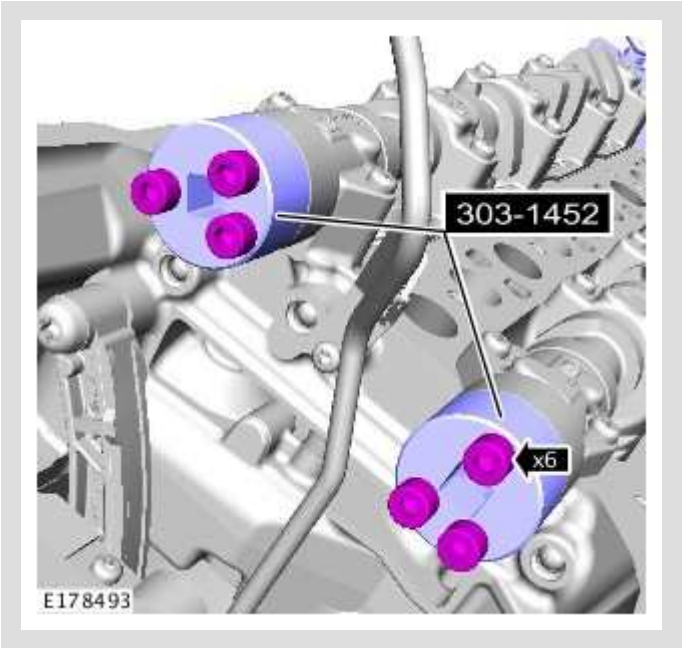


Install the timing chain fixed guides.

Torque: **12 Nm**

3.

cardiagn.com



Install the special tool to each Camshaft.

Special Tool(s): 303-1452

Torque: **10 Nm**

4.

cardiagn.com

Carefully rotate the camshafts if the position is not as shown.

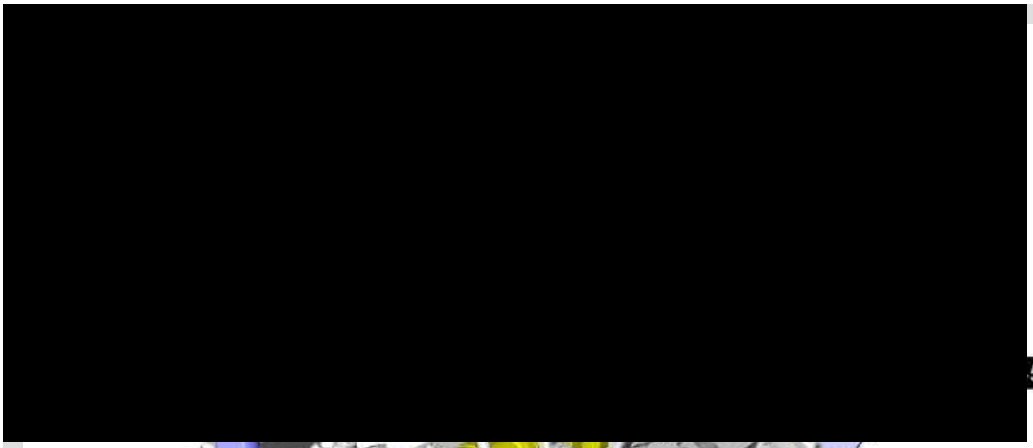
5.

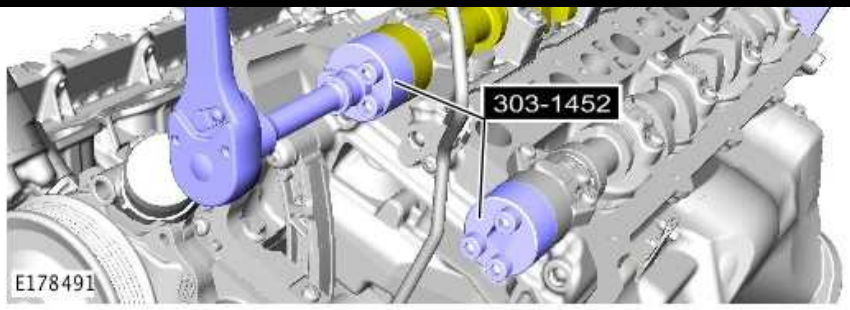
CAUTIONS:

Do not overturn the camshafts.

Tighten the wing nuts finger tight. Failure to follow this instruction may result in damage to the components.

cardiagn.com

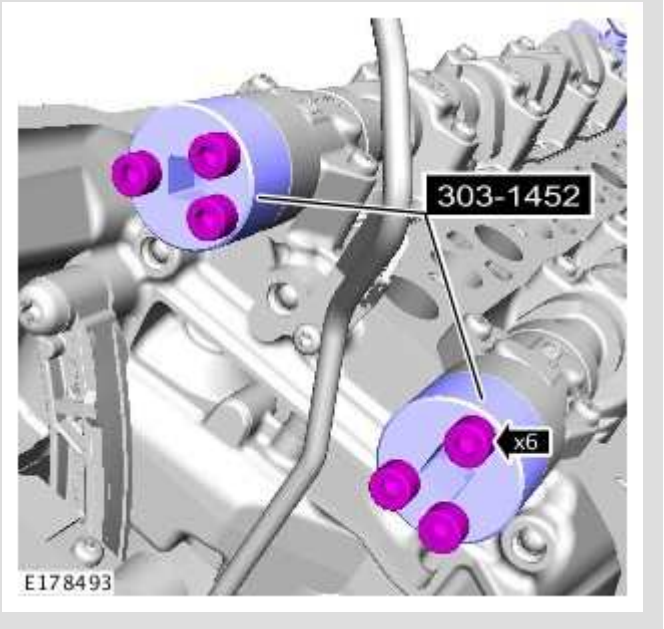




Special Tool(s): 303-1452

Using a suitable tool, carefully rock the camshaft clockwise then anti-clockwise. Turn the special tool locking nuts until there is no movement left in camshafts. Repeat this step for both camshafts.

6.



cardiagn.com

Remove the special tool from each Camshaft.

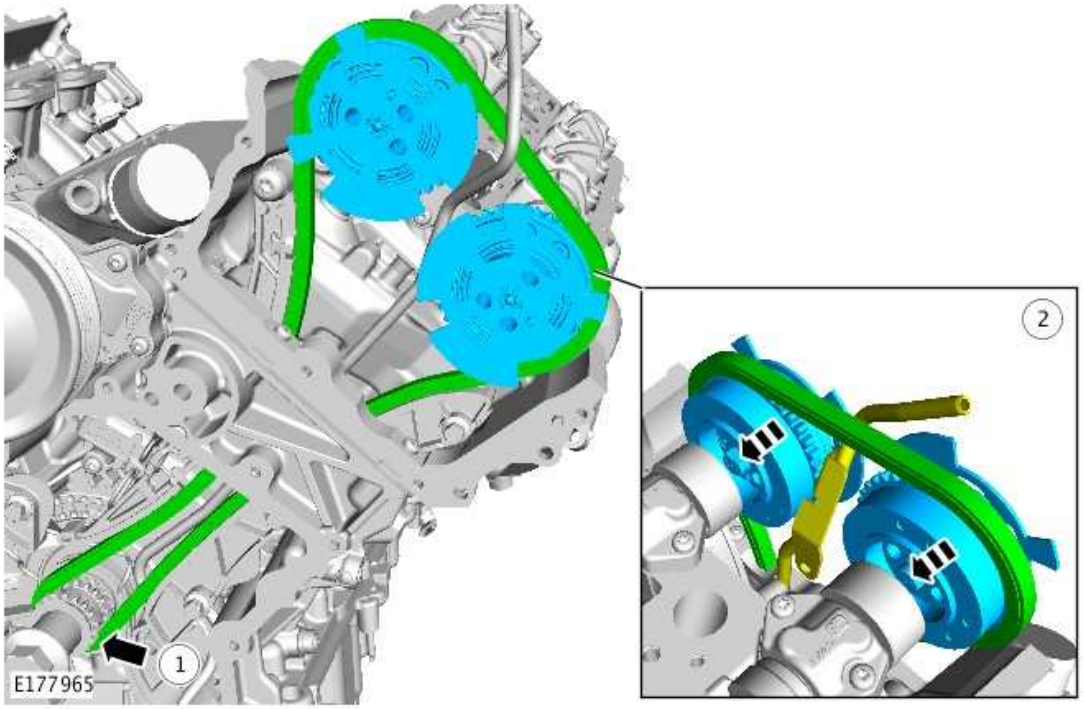
Special Tool(s): 303-1452

7.

CAUTIONS:

Do not allow the camshaft to rotate.

If the VVT is knocked or dropped then new VVT(s) must be installed.



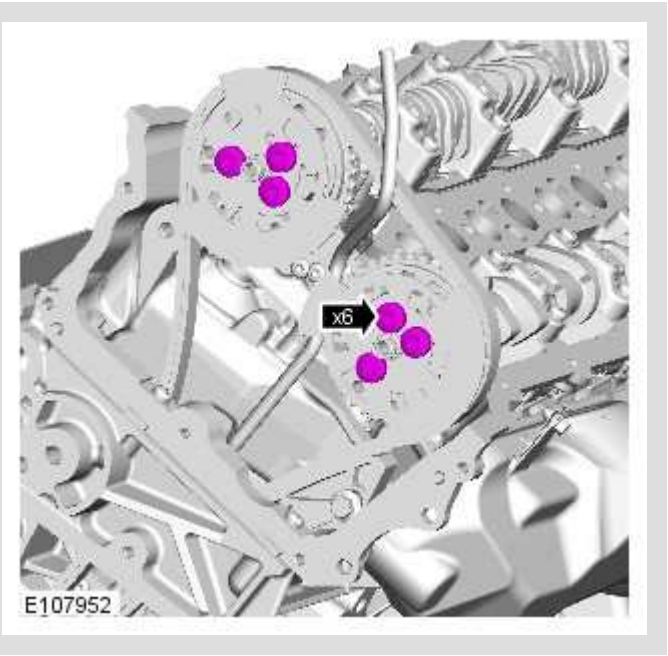
Install the timing chain with the VVT units.

8.

NOTE:

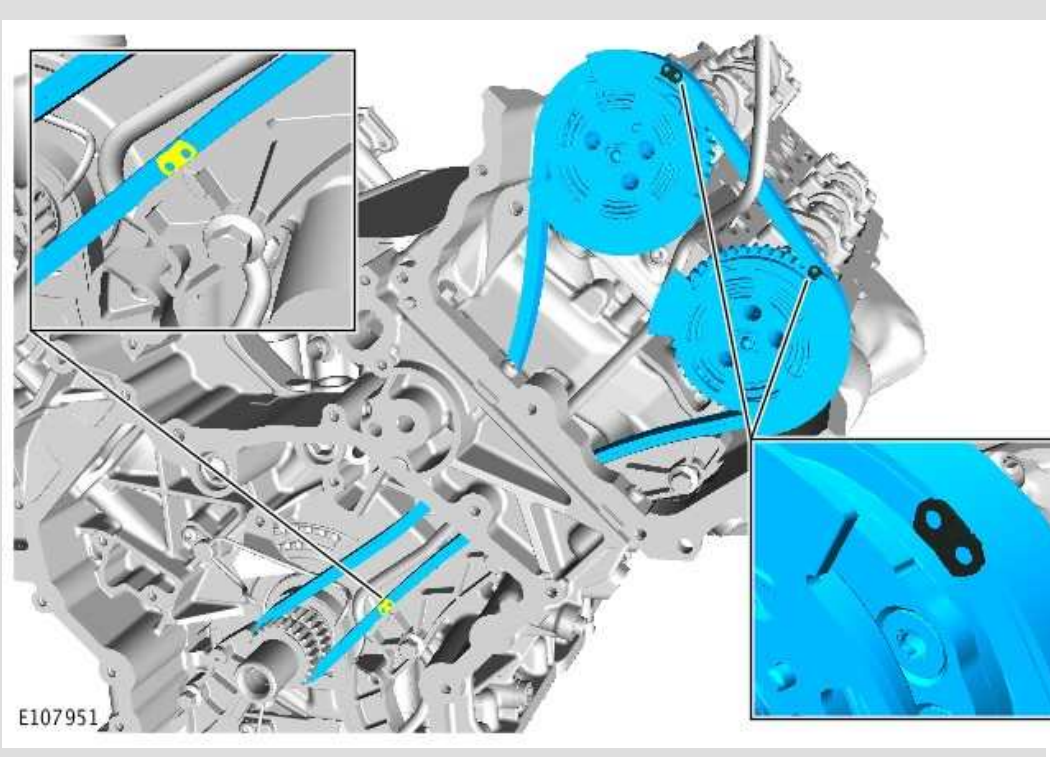
Install the bolts finger tight at this stage.

cardiagn.com



Install the variable valve timing (VVT) unit bolts.

9.



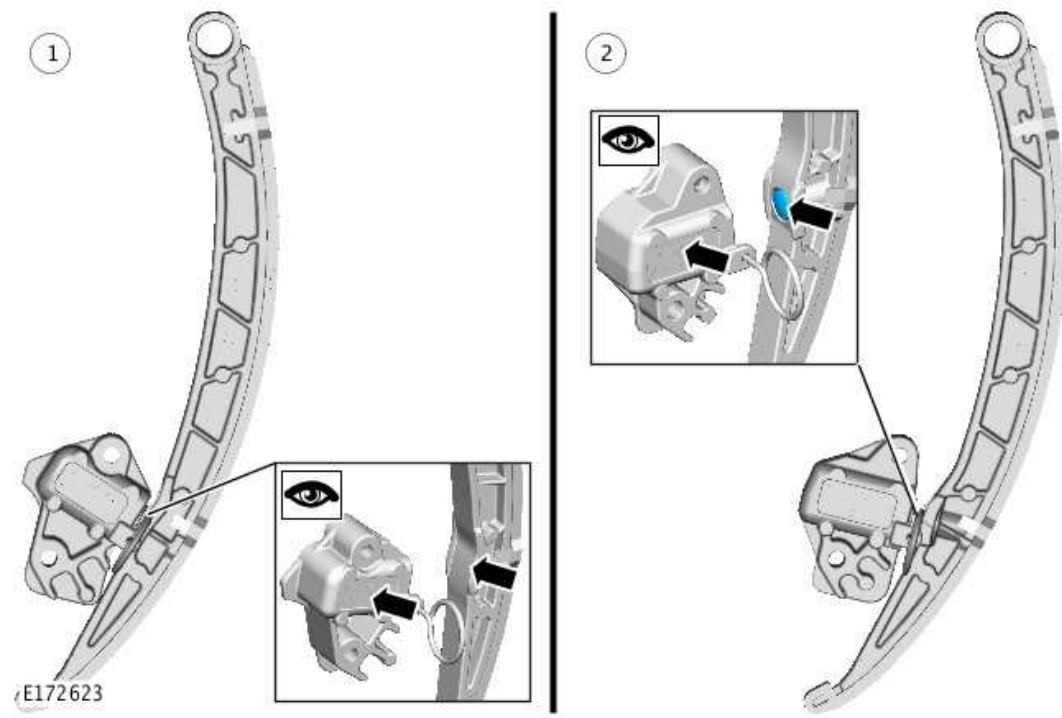
Make sure that all the timing chain alignment marks are in the positions shown.

cardiagn.com

10.

CAUTIONS:

- If the vehicle is fitted with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



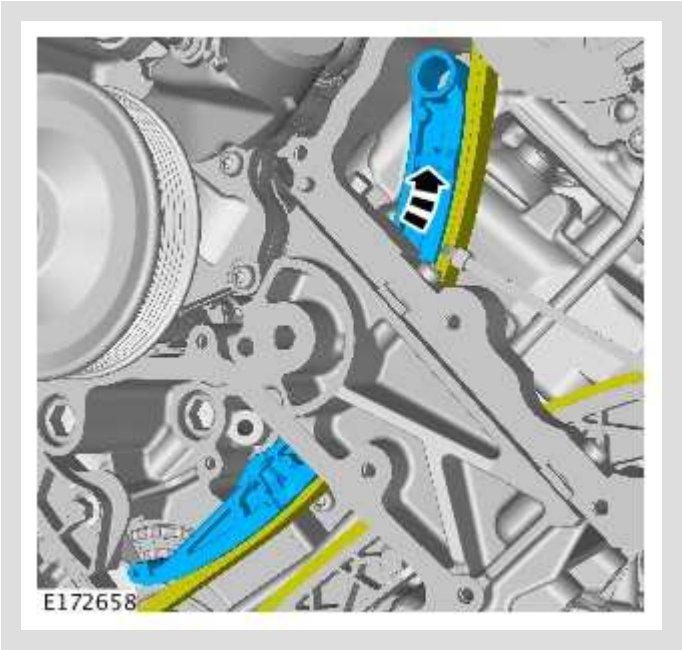
Using the illustration, identify which timing chain tensioner and guide is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only.

11.

CAUTION:

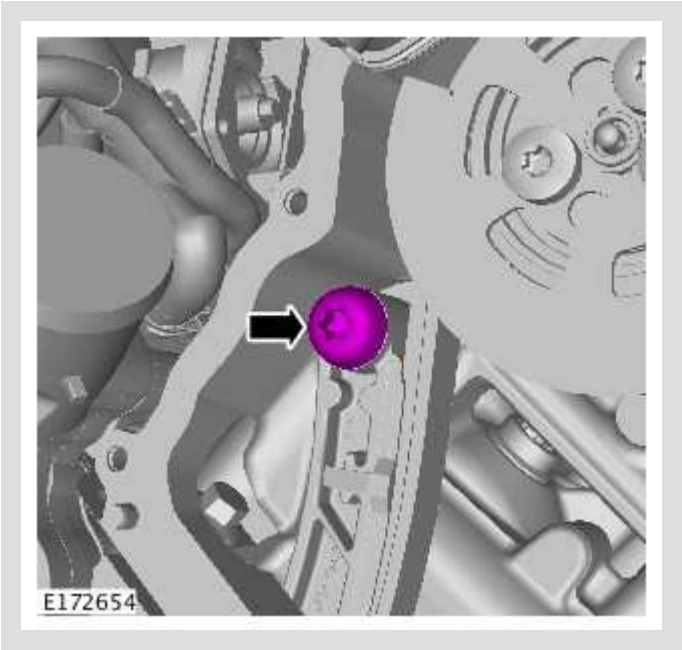
Make sure that a new component is installed.

cardiagn.com



Install the timing chain guide.

12.



Install the timing chain guide bolt.

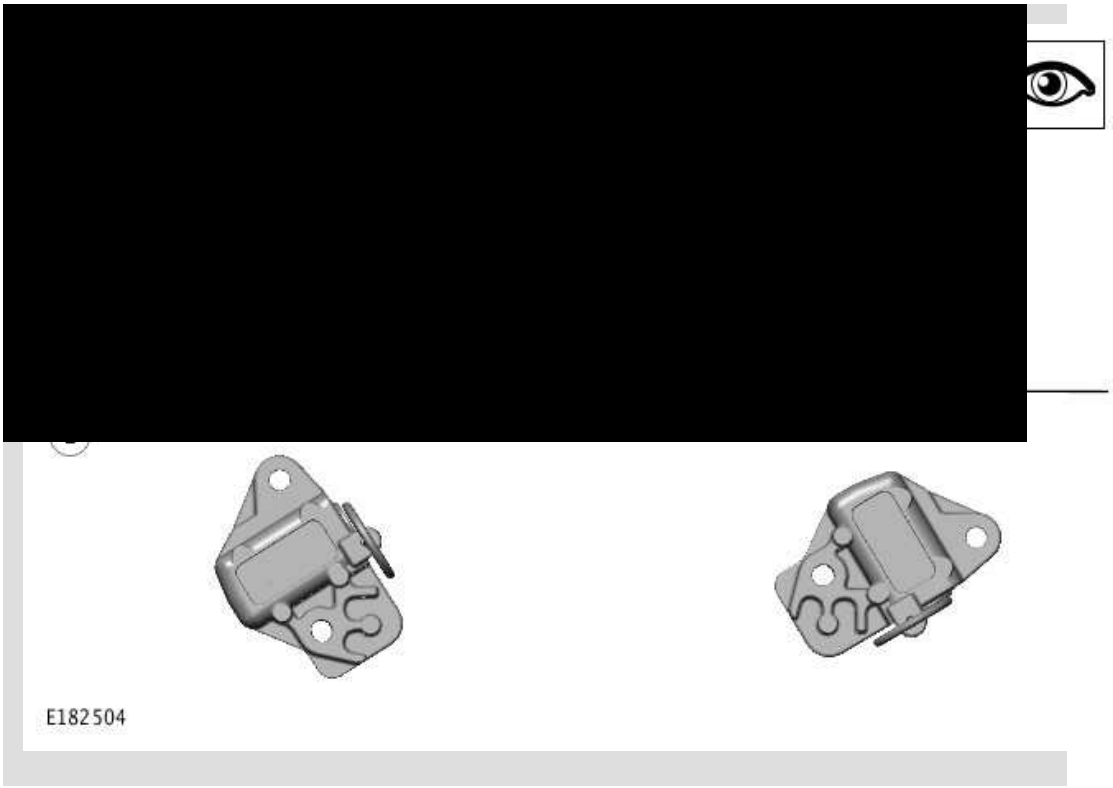
Torque: **25 Nm**

13.

cardiagn.com

CAUTIONS:

- If the vehicle is Installed with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



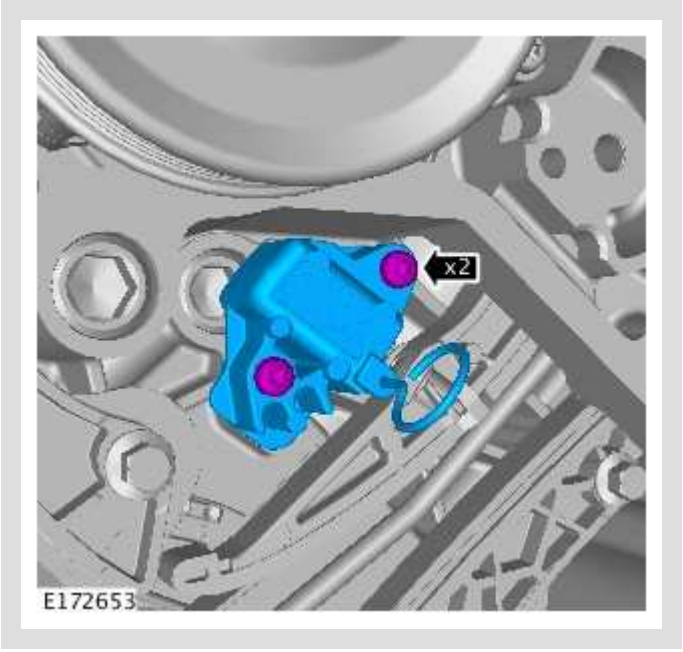
Before installing the timing chain tensioners, use the illustration shown to identify which timing chain tensioner is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only. If a new timing chain tensioner is installed, do not deploy the tensioner pin and proceed to the next step. If the tensioner to be installed has previously been deployed, make sure the attached animation is followed to make sure the tensioner is set correctly, failure to do this may result in damage to the engine.

cardiagn.com

14.

CAUTION:

Do not release the timing chain tensioner locking pin at this stage.

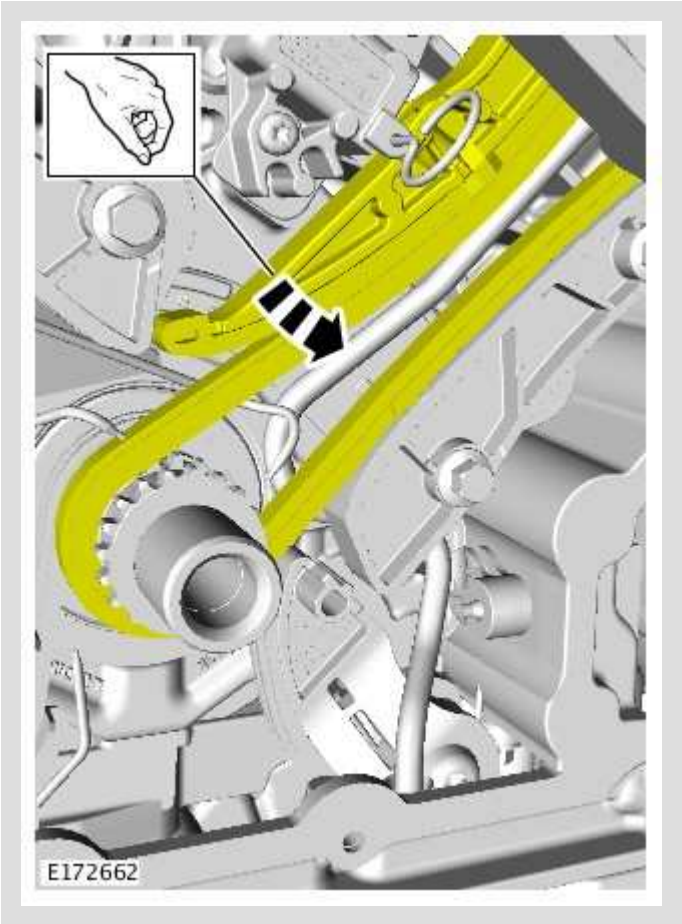


Install the timing chain tensioner.

Torque: **12 Nm**

15.

cardiagn.com

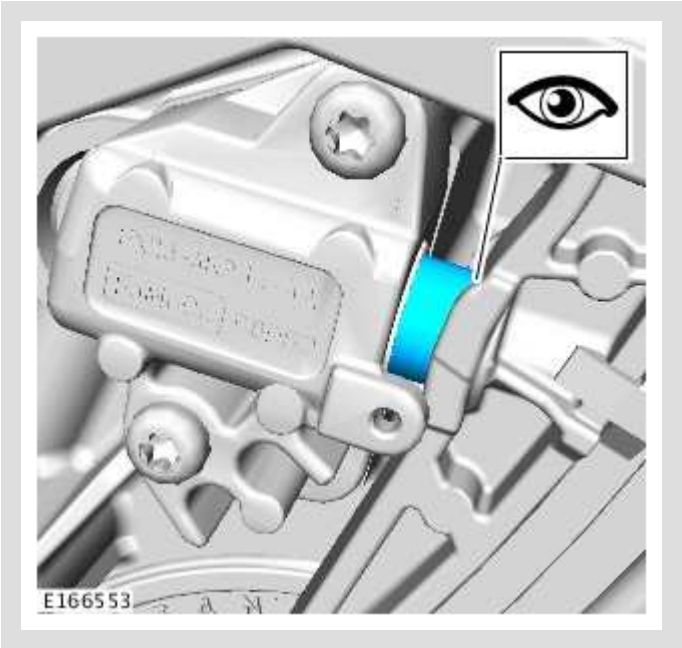


Apply and maintain tension on the component.

cardiagn.com

Remove the timing chain tensioner retaining pin and release the timing chain guide.

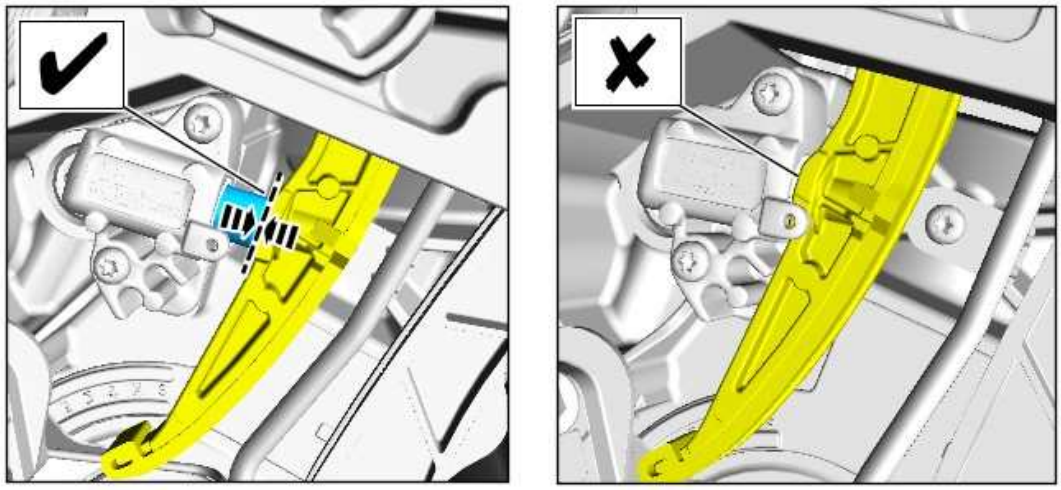
17.



The timing chain tensioner piston should apply tension to the timing chain guide.

18.

cardiagn.com

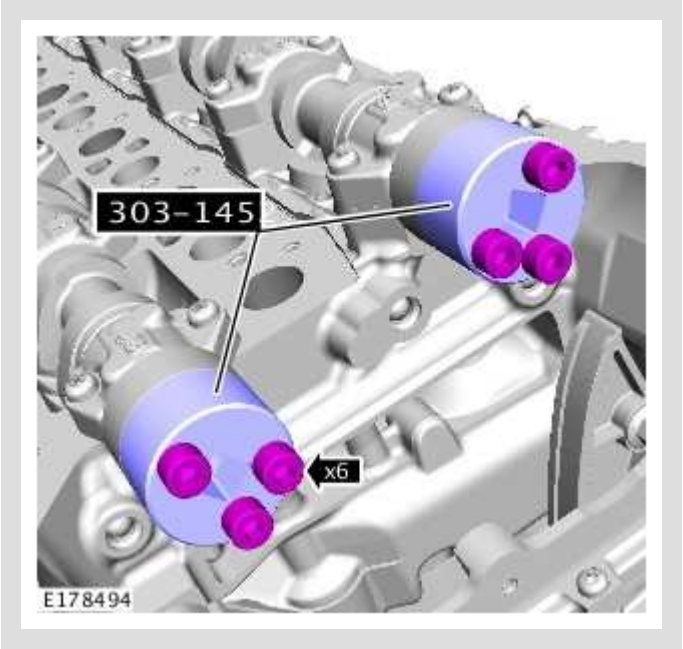


E166556

The timing chain tensioner must maintain tension on the chain guide. If the piston can be pushed back so the chain guide contacts with the body of the tensioner, the tensioner is not correct. Repeat steps 13-18.

19.

cardiagn.com



Install the special tool to each Camshaft.

Special Tool(s): 303-1452

Torque: **10 Nm**

20.

cardiagn.com

CAUTION:

Do not overturn the camshafts.

Carefully rotate the camshafts if the position is not as shown.

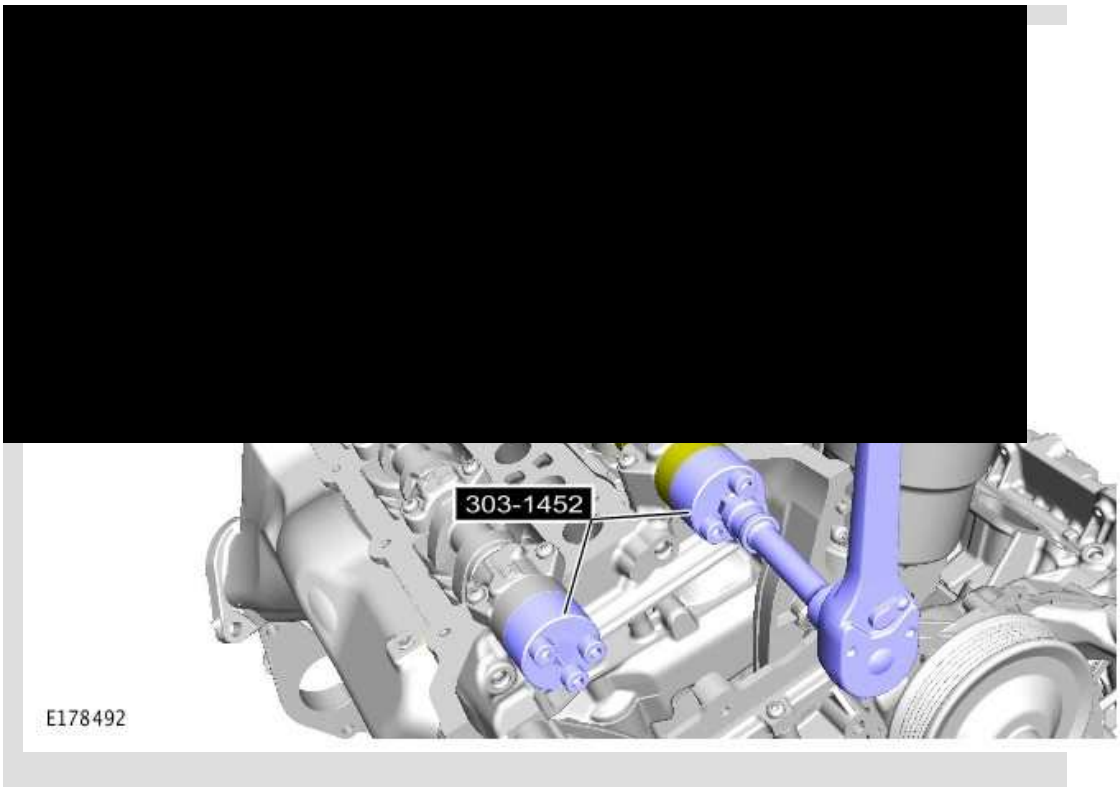
21.

cardiagn.com

CAUTIONS:

Do not overturn the camshafts.

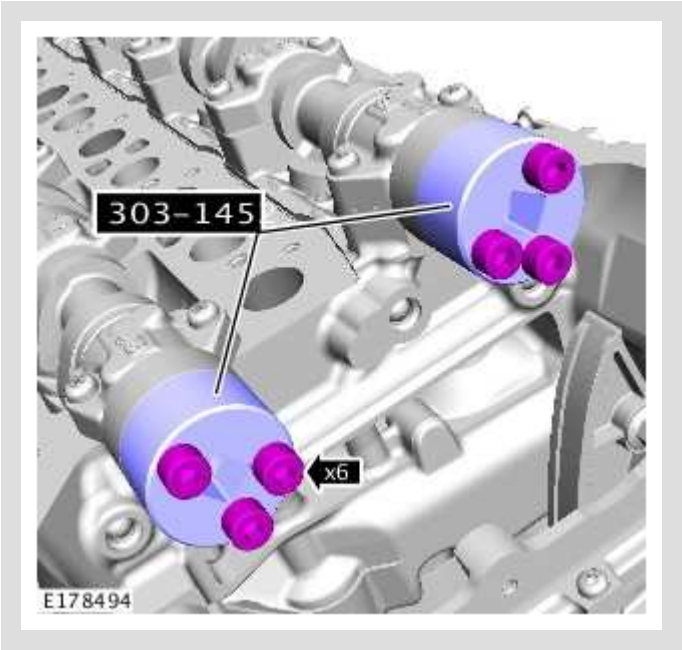
Tighten the wing nuts finger tight. Failure to follow this instruction may result in damage to the components.



Special Tool(s): 303-1452

Using a suitable tool, carefully rock the camshaft clockwise then anti-clockwise. Turn the special tool locking nuts until there is no movement left in camshafts. Repeat this step for both camshafts.

cardiagn.com



Remove the special tool from each Camshaft.

Special Tool(s): 303-1452

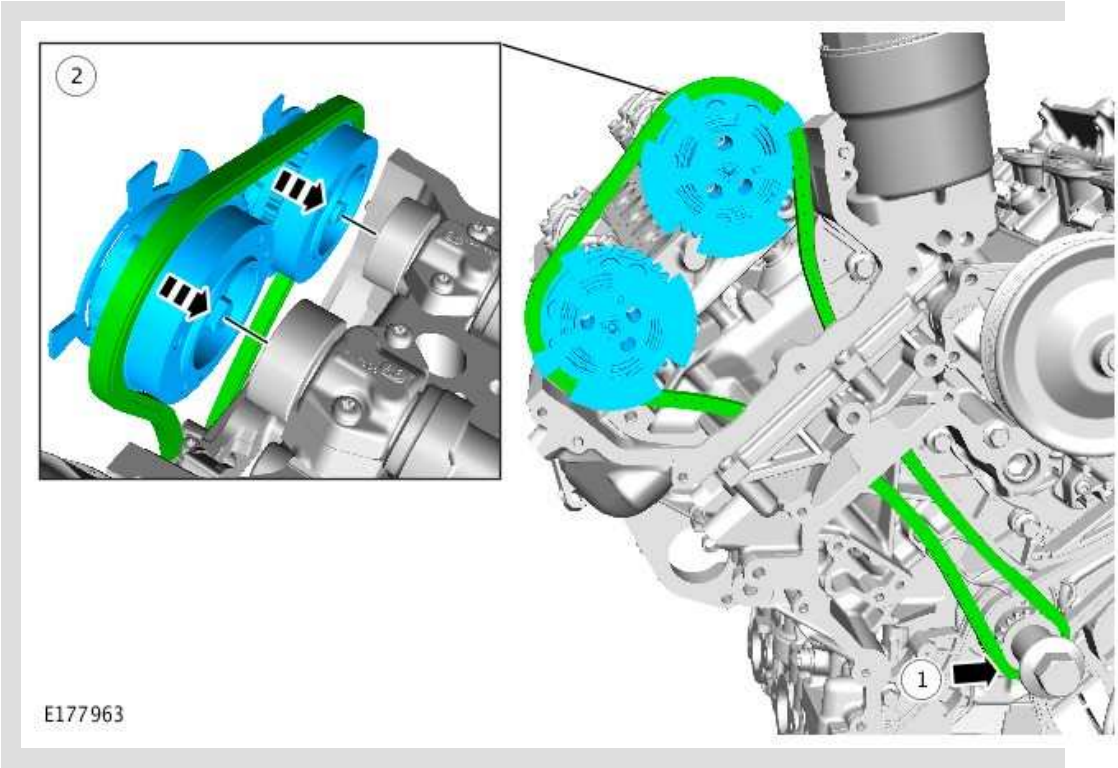
23.

CAUTIONS:

Do not allow the camshafts to rotate.

If the VVT is knocked or dropped then new VVT(s) must be installed.

cardiagn.com



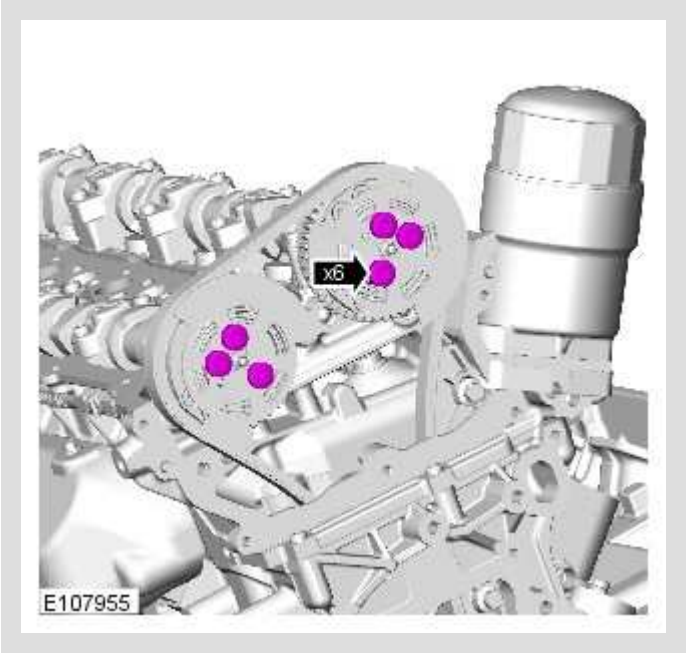
Install the timing chain with the VVT units.

24.

NOTE:

Install the bolts finger tight at this stage.

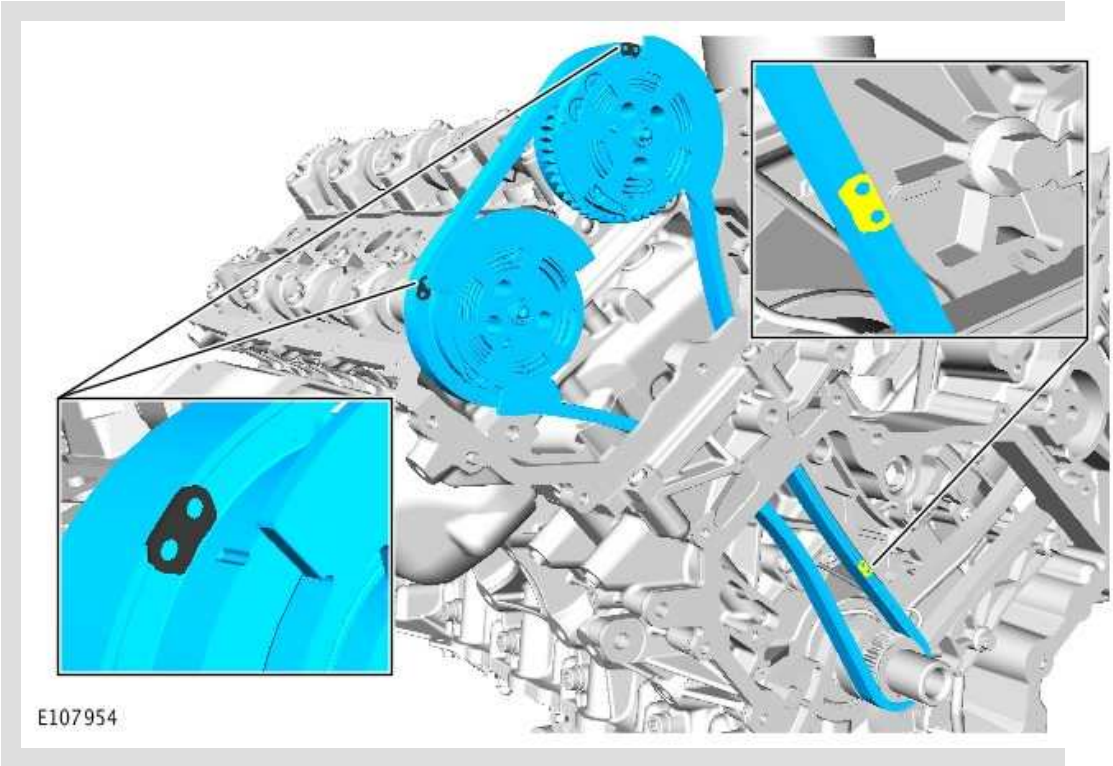
cardiagn.com



Install the variable valve timing (VVT) unit bolts.

25.

cardiagn.com

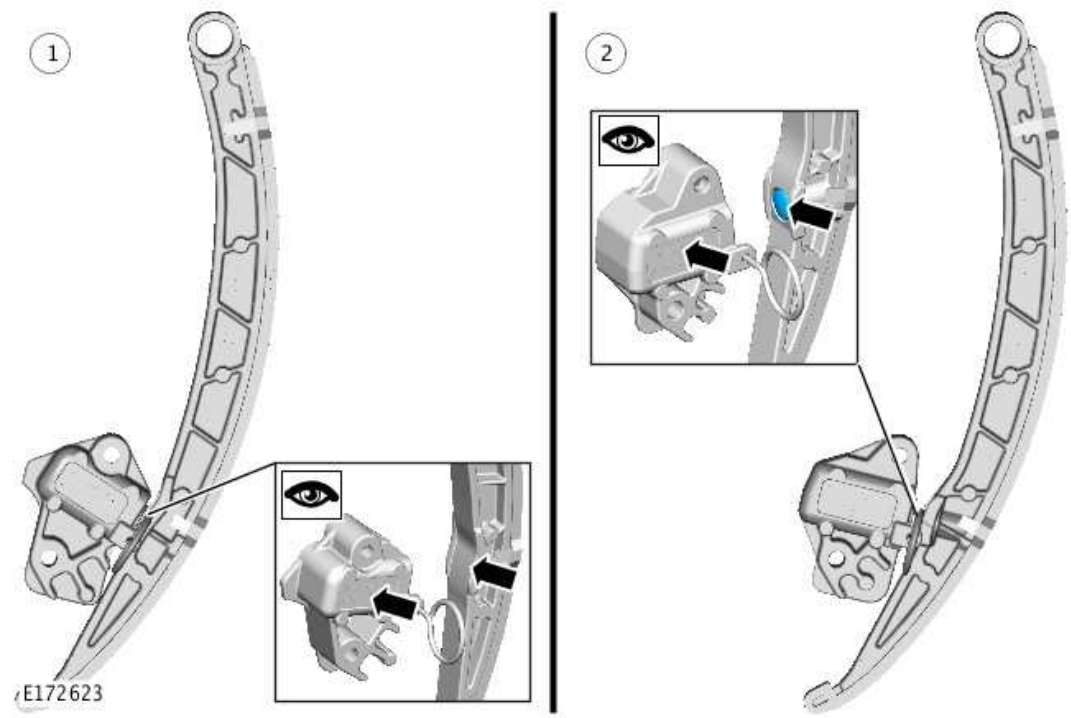


Make sure that all the timing chain alignment marks are in the positions shown.

cardiagn.com

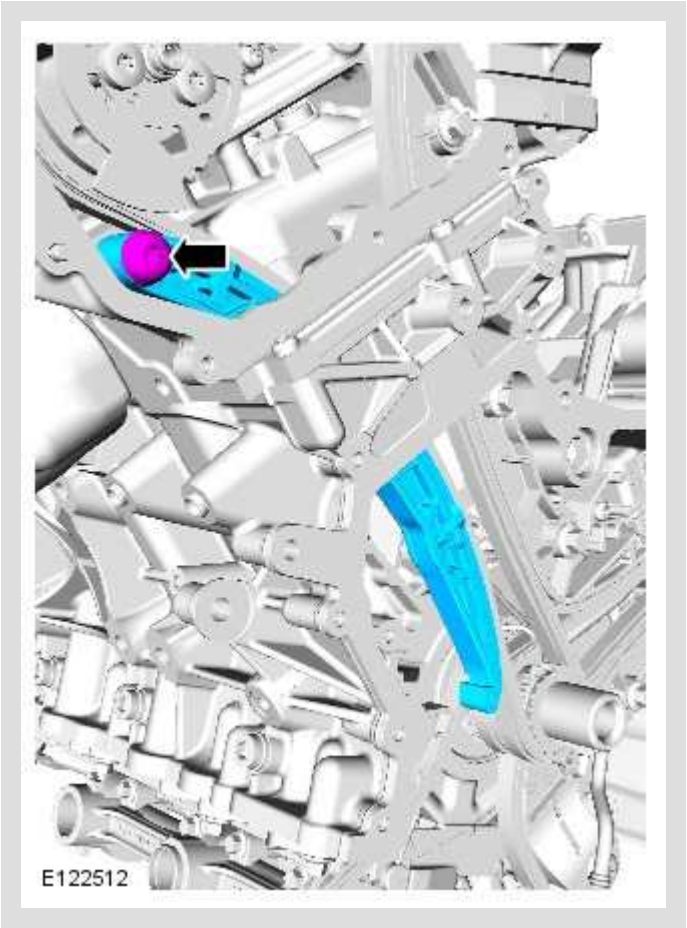
CAUTIONS:

- If the vehicle is fitted with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



Using the illustration, identify which timing chain tensioner and guide is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only.

cardiagn.com



Install the timing chain guide.

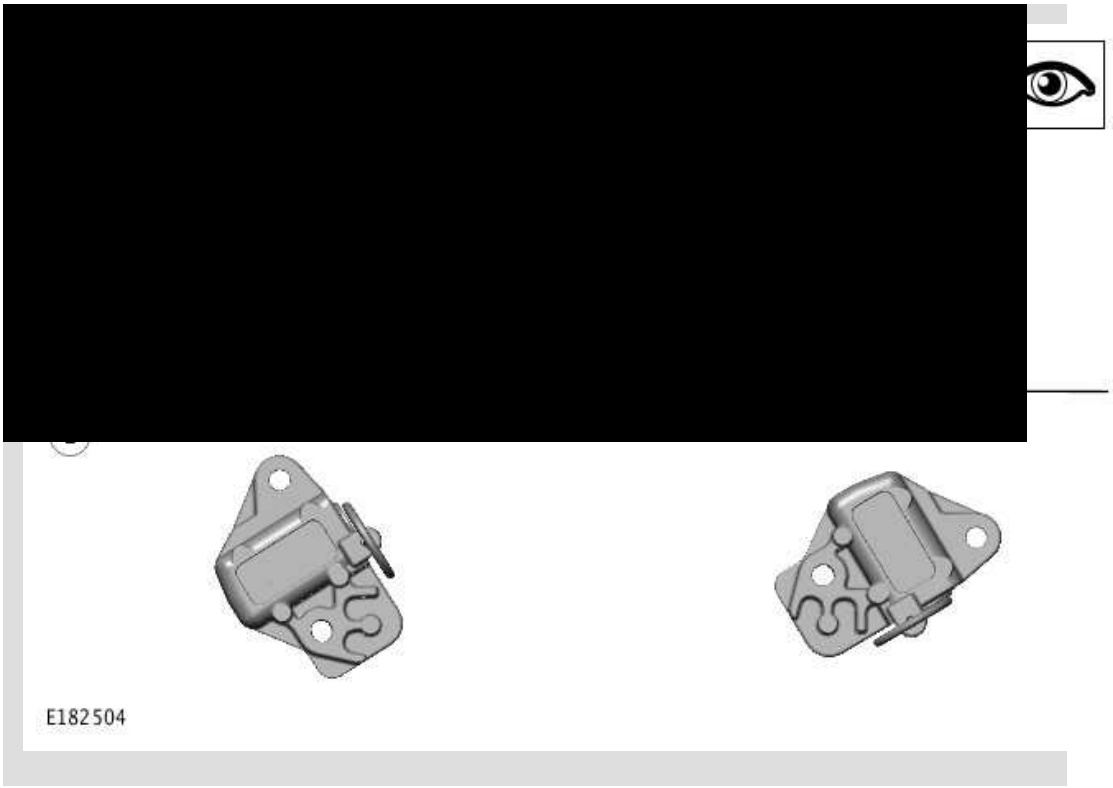
Torque: **25 Nm**

28.

cardiagn.com

CAUTIONS:

- If the vehicle is Installed with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



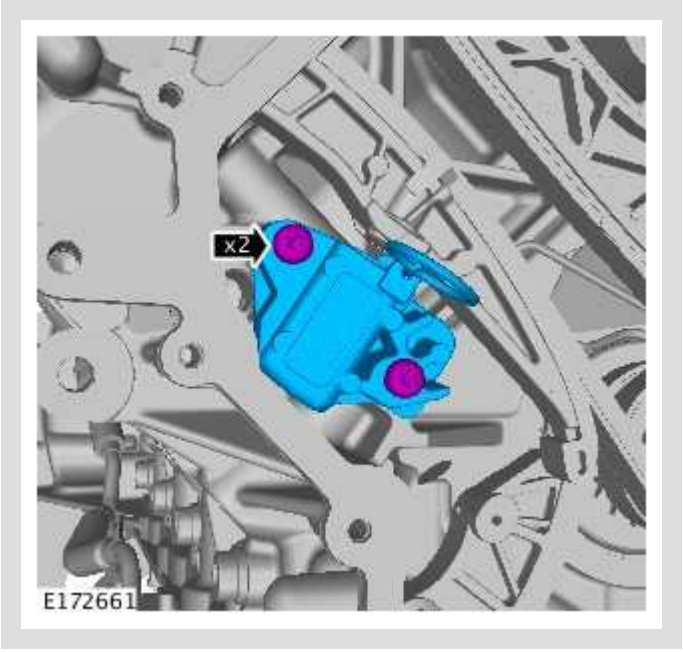
Before installing the timing chain tensioners, use the illustration shown to identify which timing chain tensioner is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only. If a new timing chain tensioner is installed, do not deploy the tensioner pin and proceed to the next step. If the tensioner to be installed has previously been deployed, make sure the attached animation is followed to make sure the tensioner is set correctly, failure to do this may result in damage to the engine.

cardiagn.com

29.

CAUTION:

Do not release the timing chain tensioner locking pin at this stage.

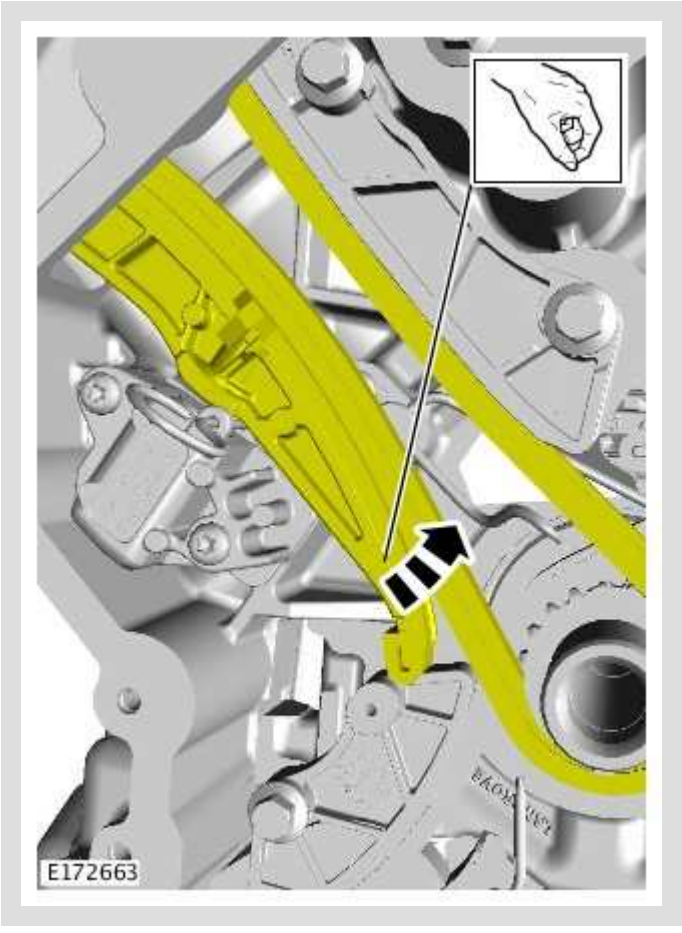


Before installing the timing chain tensioners, make sure the attached animation is followed to ensure the tensioner is set correctly, failure to do this may result in damage to the engine.

Torque: **12 Nm**

30.

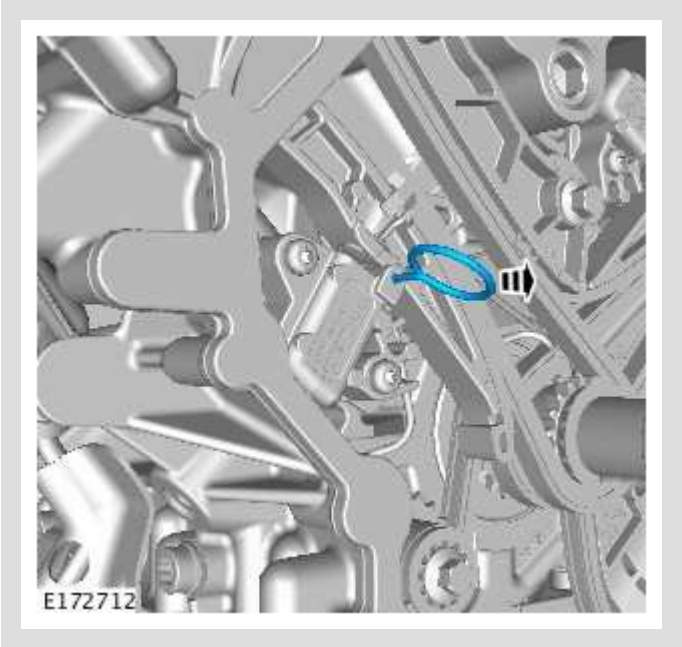
cardiagn.com



Apply and maintain tension on the component.

31.

cardiagn.com



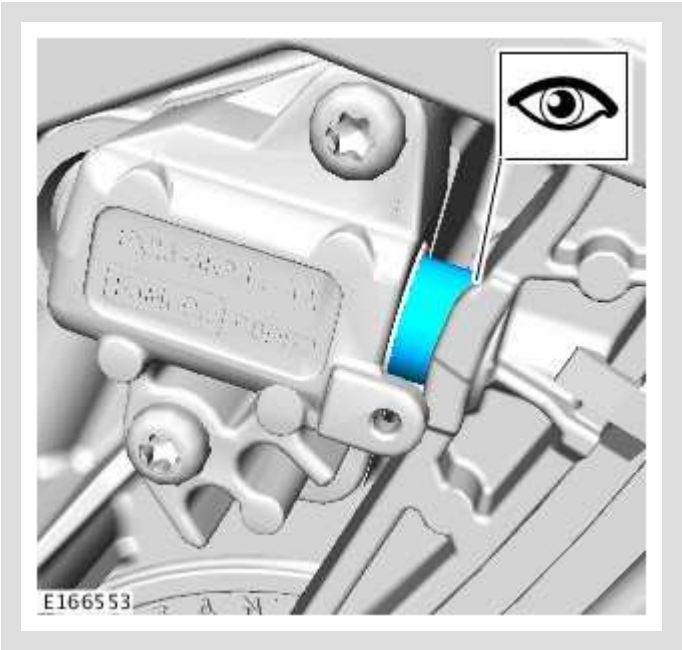
Remove the timing chain tensioner retaining pin and release the timing chain guide.

32.

NOTE:

Left hand illustration shown, Right hand is similar.

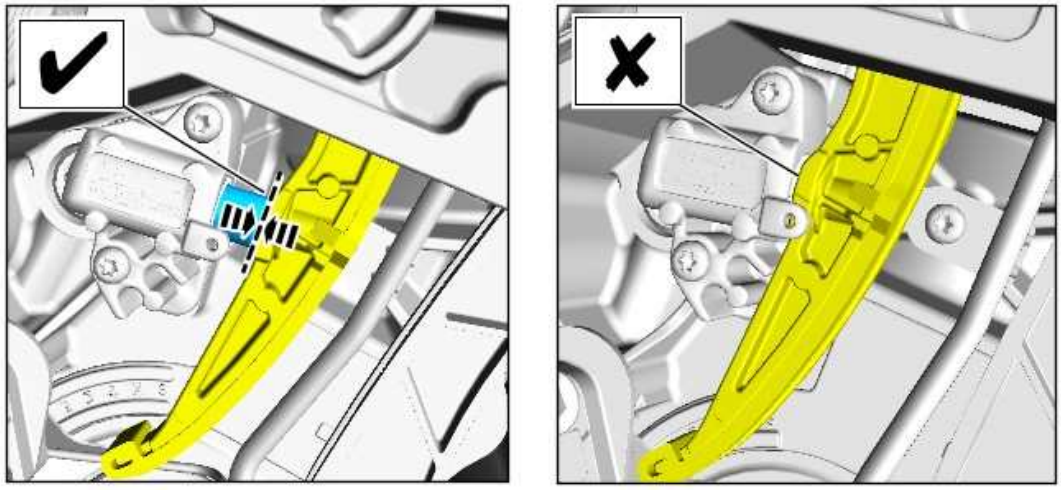
cardiagn.com



The piston should apply tension to the timing chain guide.

33.

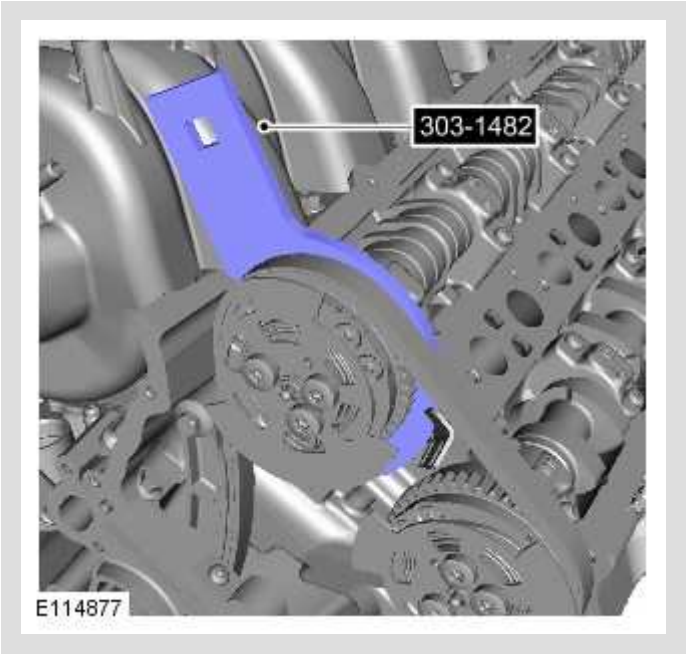
cardiagn.com



E166556

The timing chain tensioner must maintain tension on the chain guide. If the piston can be pushed back so the chain guide contacts with the body of the tensioner, the tensioner is not correct. Repeat steps 28-33.

cardiagn.com



Install the special tool.

Special Tool(s): 303-1482

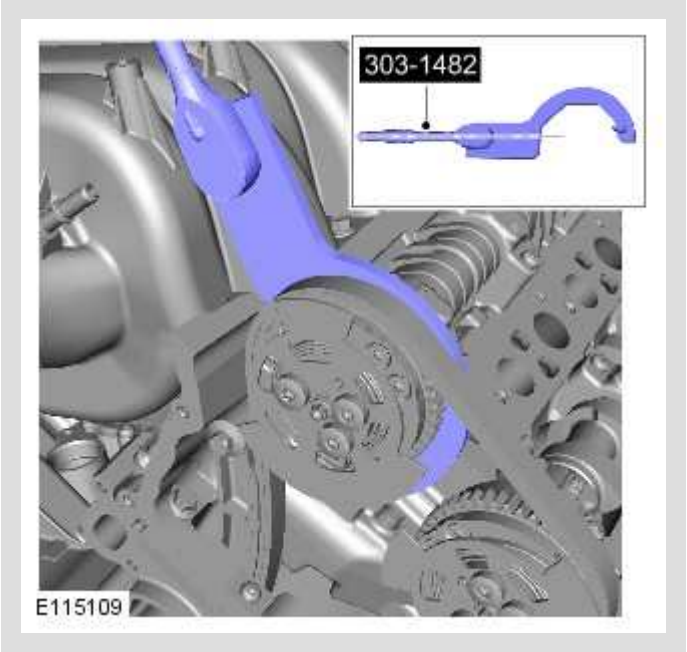
35.

CAUTIONS:

Apply the torque to the end of the special tool.

Make sure that the torque wrench is aligned with the special tool as illustrated in the graphic.

cardiagn.com



Install the torque wrench to the special tool.

Torque: **35 Nm**

36.

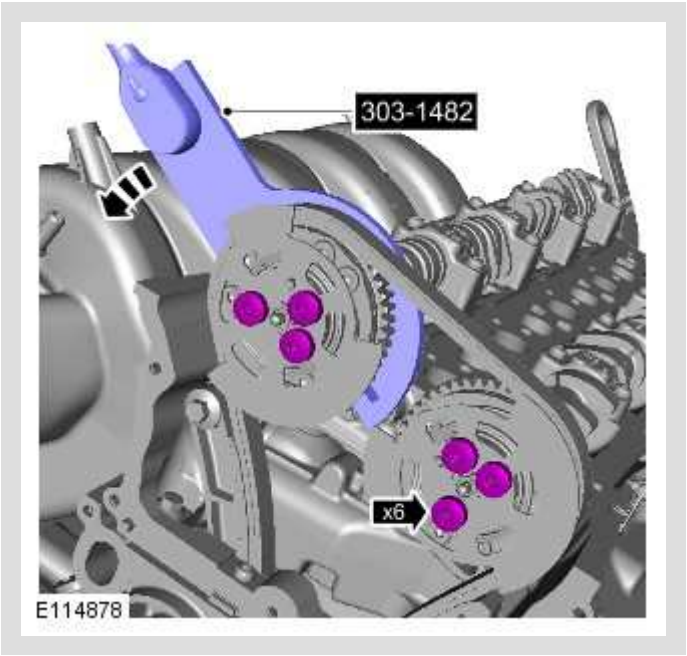
CAUTION:

Make sure that the torque wrench does not move whilst tightening the VVT bolts.

NOTE:

Make sure to tighten the exhaust VVT unit bolts first.

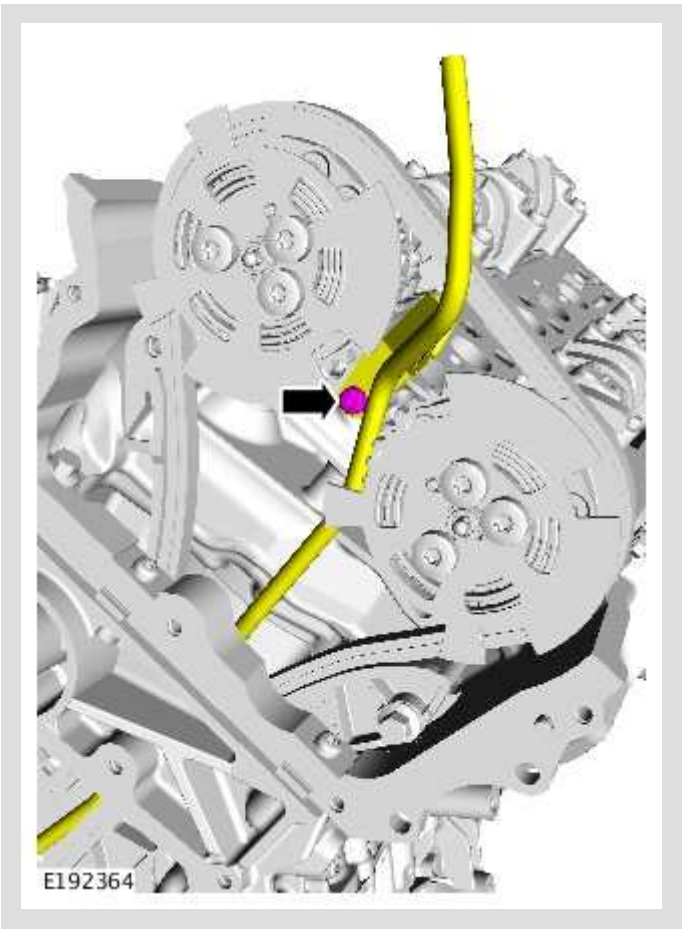
cardiagn.com



1. *Torque:* **32 Nm**

1. *Special Tool(s):* 303-1482

37.

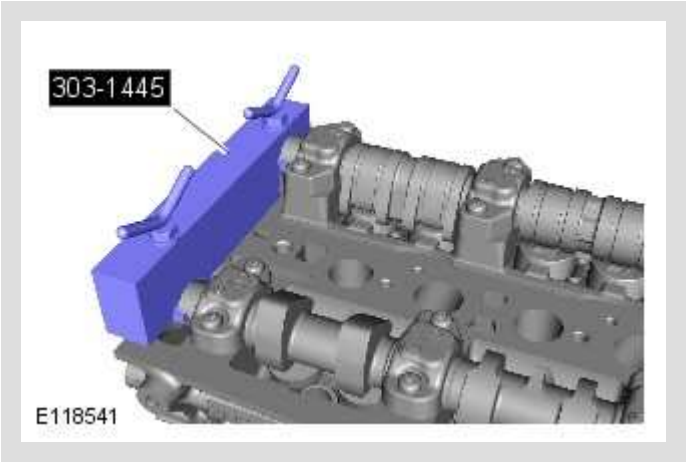


Install the oil drain tube.

cardiagn.com

Torque: **10 Nm**

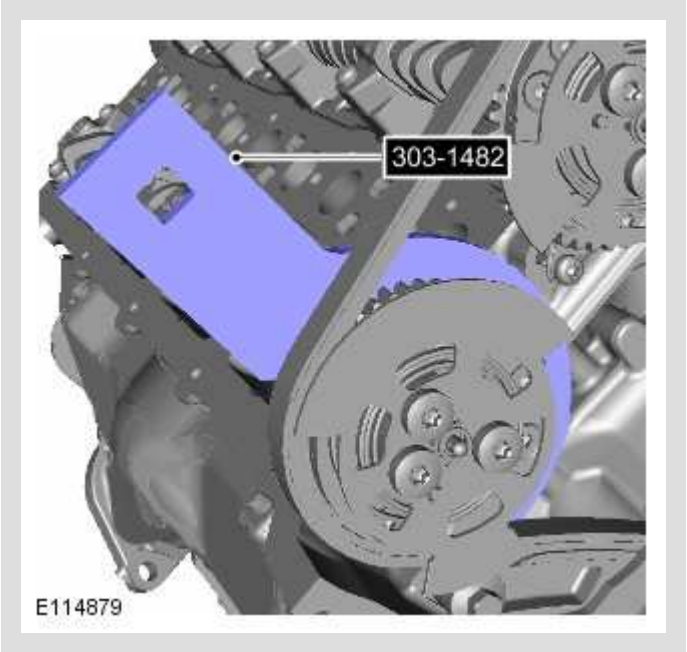
38.



Remove the special tool.

Special Tool(s): 303-1445

39.



Install the special tool.

Special Tool(s): 303-1482

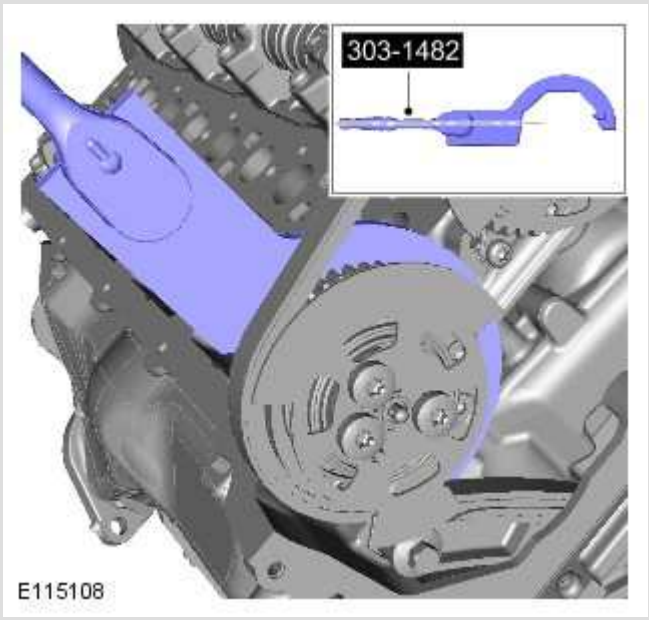
40.

cardiagn.com

CAUTIONS:

Apply the torque to the end of the special tool.

Make sure that the torque wrench is aligned with the special tool as illustrated in the graphic.



Install the torque wrench to the special tool.

Torque: **35 Nm**

41.

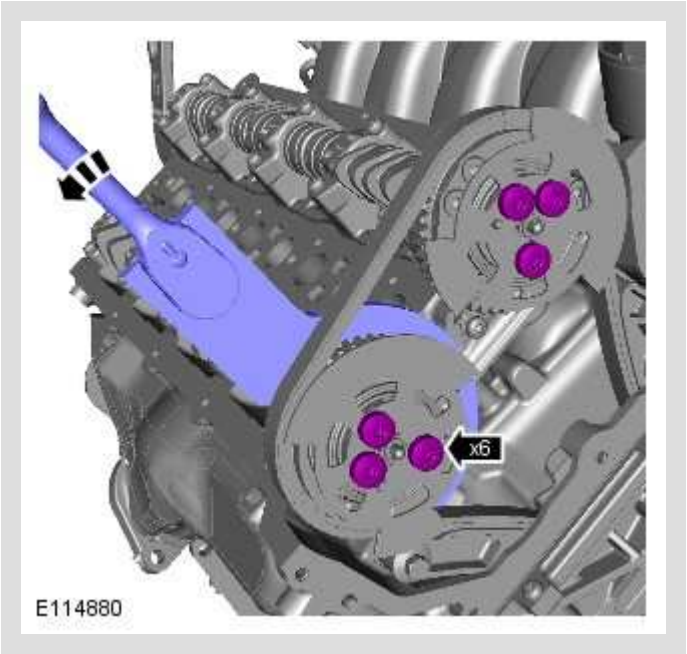
CAUTION:

Make sure that the torque wrench does not move whilst tightening the VVT bolts.

NOTE:

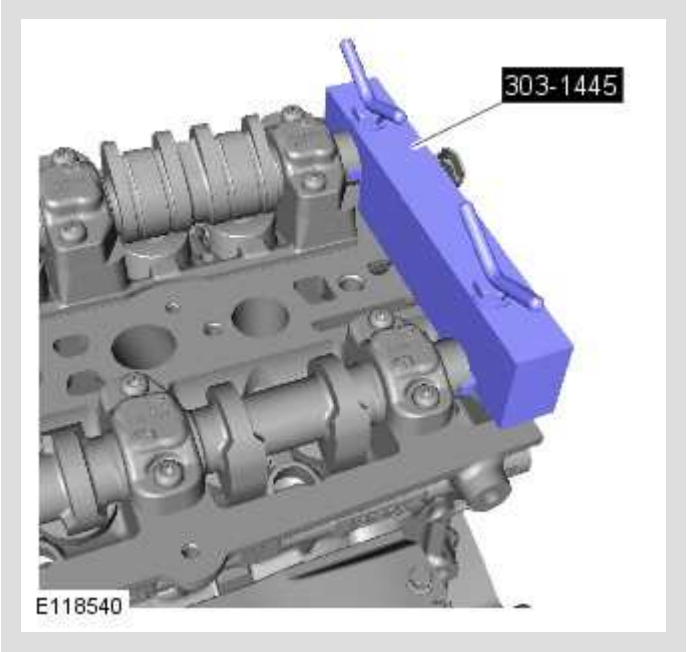
Make sure to tighten the inlet VVT unit bolts first.

cardiagn.com



Torque: **32 Nm**

42.

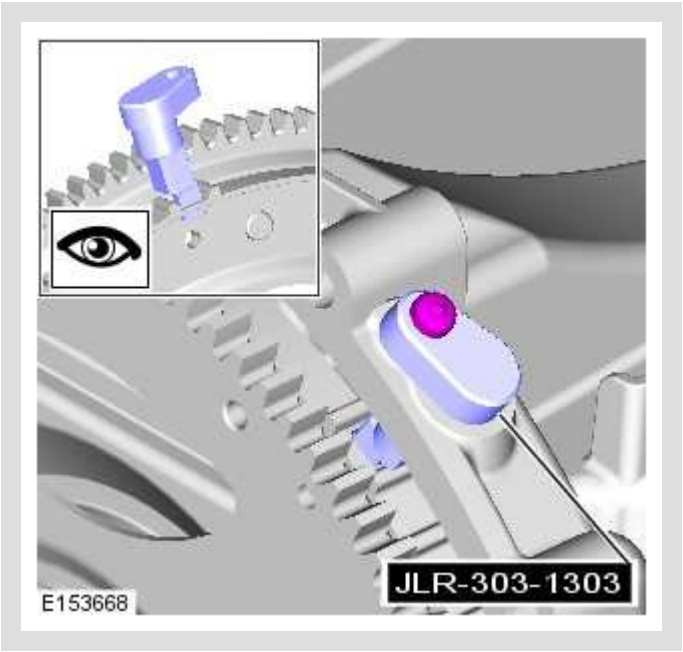


Remove the special tool.

Special Tool(s): 303-1445

43.

cardiagn.com



Remove the special tool.

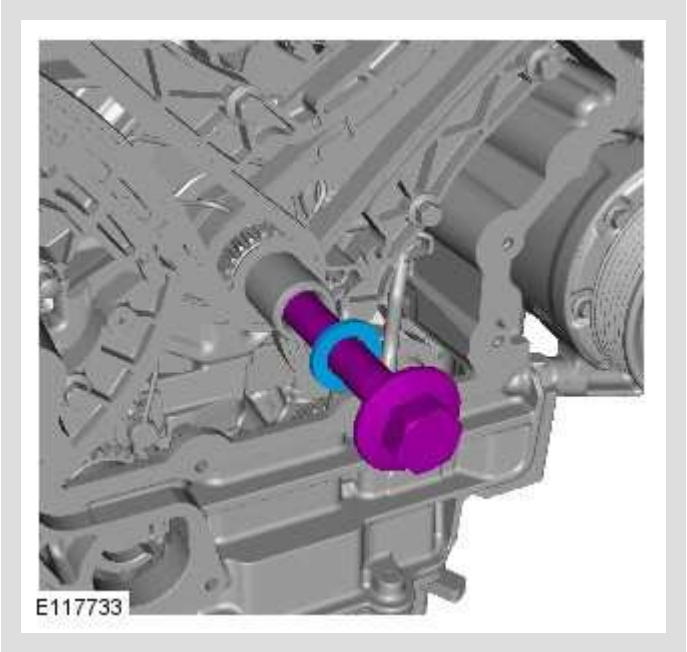
Special Tool(s): JLR-303-1303

44.

CAUTION:

An M16 washer must be used to prevent damage to the crankshaft on installation.

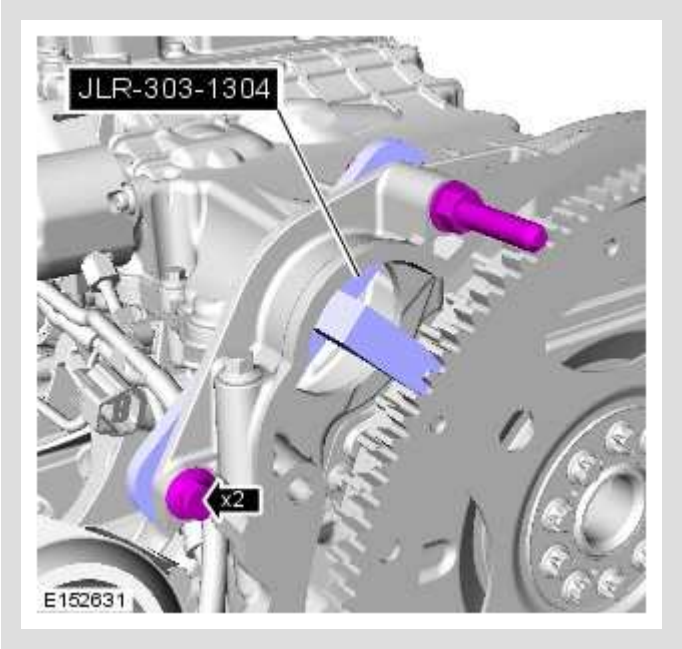
cardiagn.com



Install the crankshaft pulley bolt.

Torque: **20 Nm**

45.



Remove the special tool.

Special Tool(s): JLR-303-1304

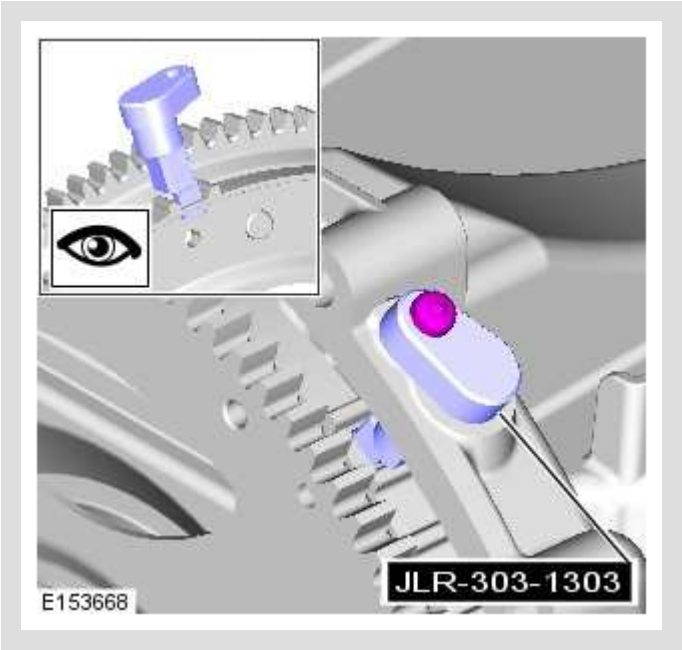
46. Rotate the engine two complete turns clockwise.

47.

CAUTION:

cardiagn.com

Only rotate the crankshaft clockwise.



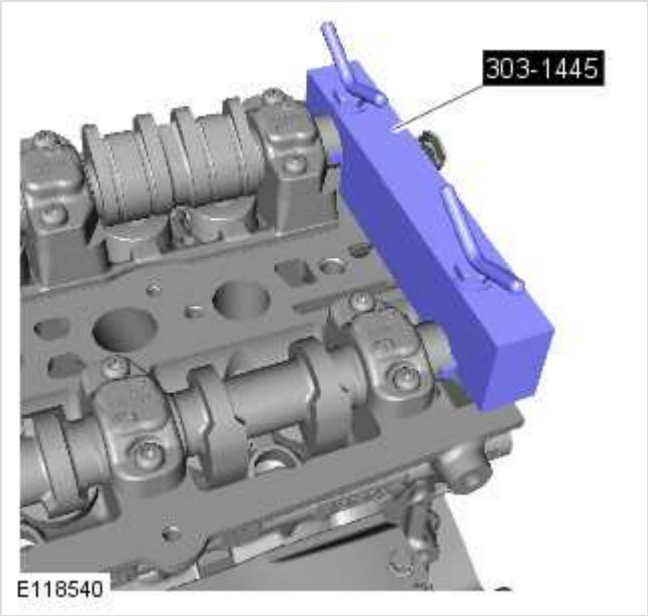
Install the special tool.
Special Tool(s): JLR-303-1303

48.

CAUTION:

If the special tool cannot be installed, the timing chain installation steps must be repeated.

cardiagn.com

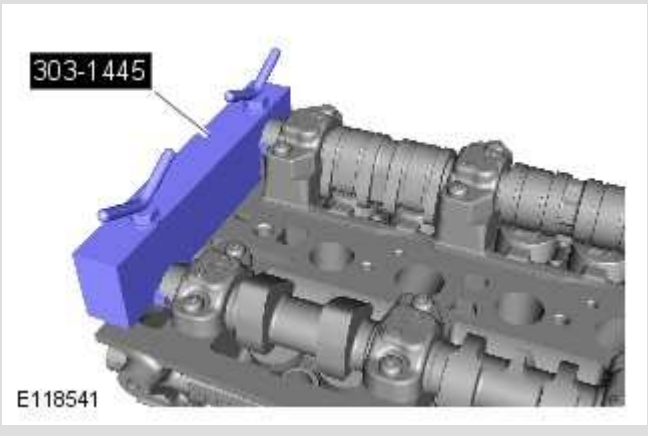


Install the special tool. If the special tool cannot be installed, remove both timing chains and components and repeat the process from step 3 of the installation until the special tool 303-1445 is installed correctly.
Special Tool(s): 303-1445

49.

CAUTION:

If the special tool cannot be installed, the timing chain installation steps must be repeated.

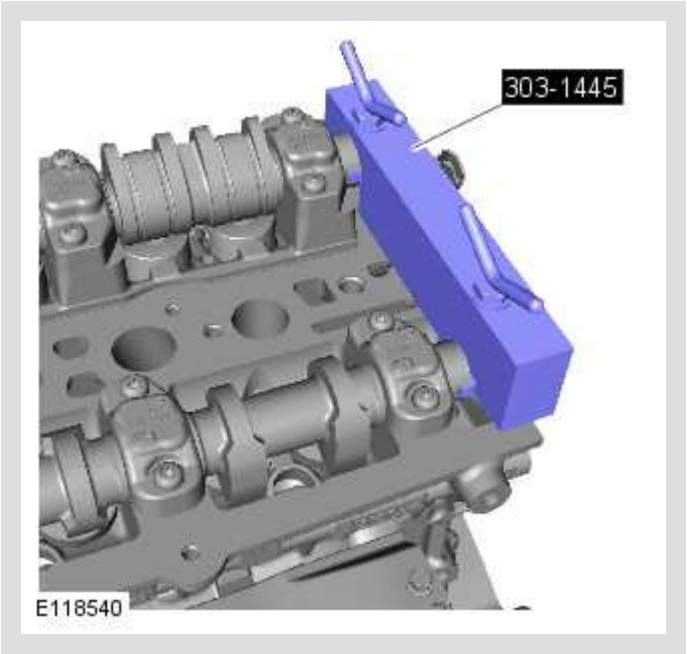


Install the special tool. If the special tool cannot be installed,

cardiagn.com

remove both timing chains and components and repeat the process from step 3 of the installation until the special tool 303-1445 is installed correctly.

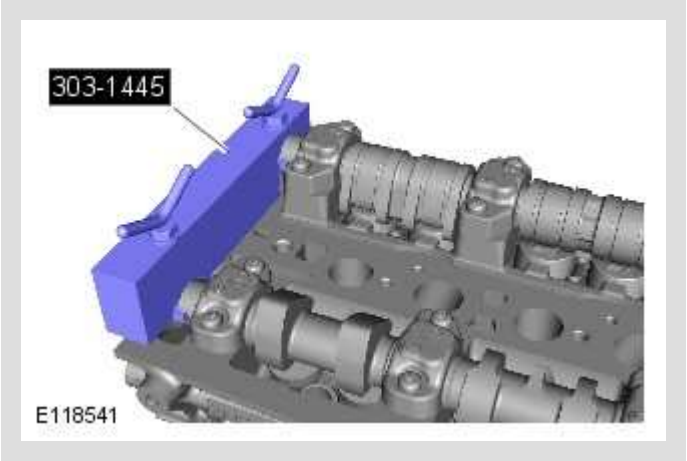
50.



Remove the special tool.

Special Tool(s): 303-1445

51.

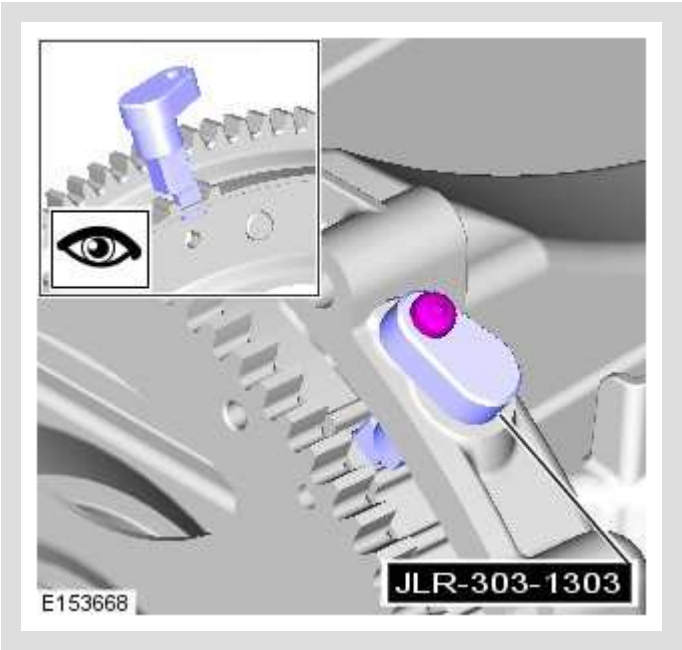


Remove the special tool.

Special Tool(s): 303-1445

52.

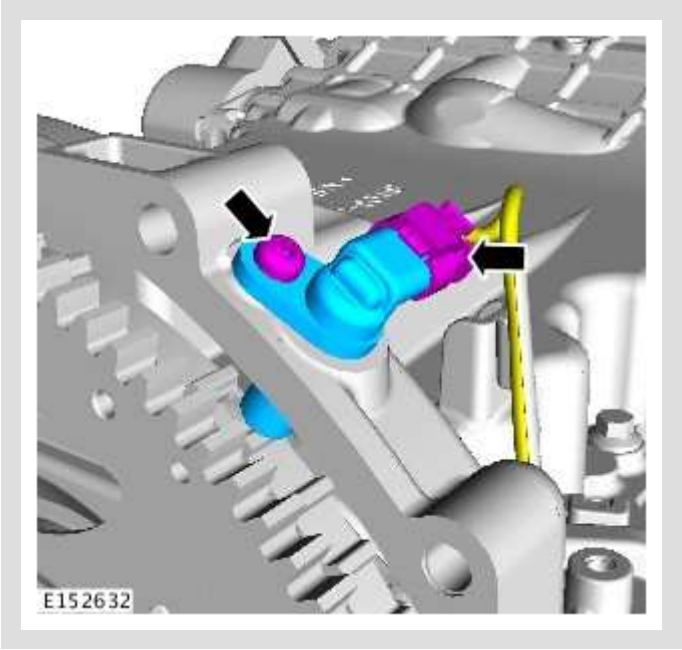
cardiagn.com



Remove the special tool.

Special Tool(s): JLR-303-1303

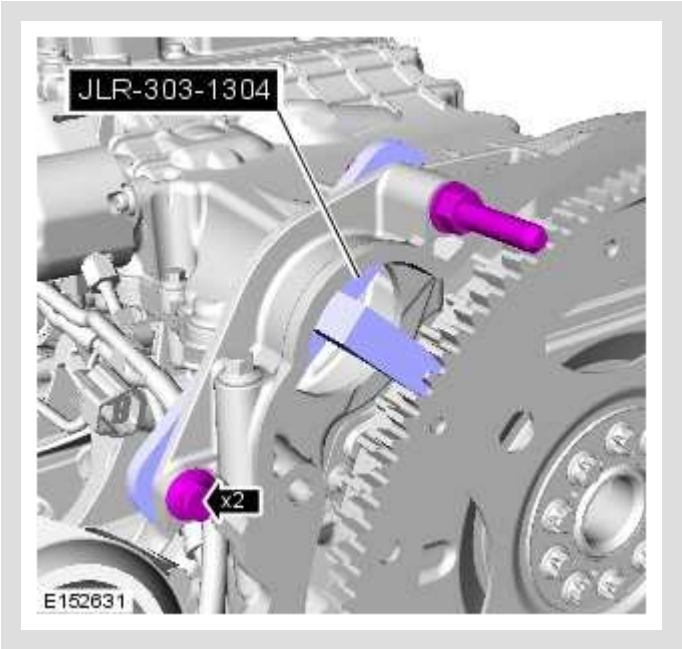
53.



Torque: **10 Nm**

54.

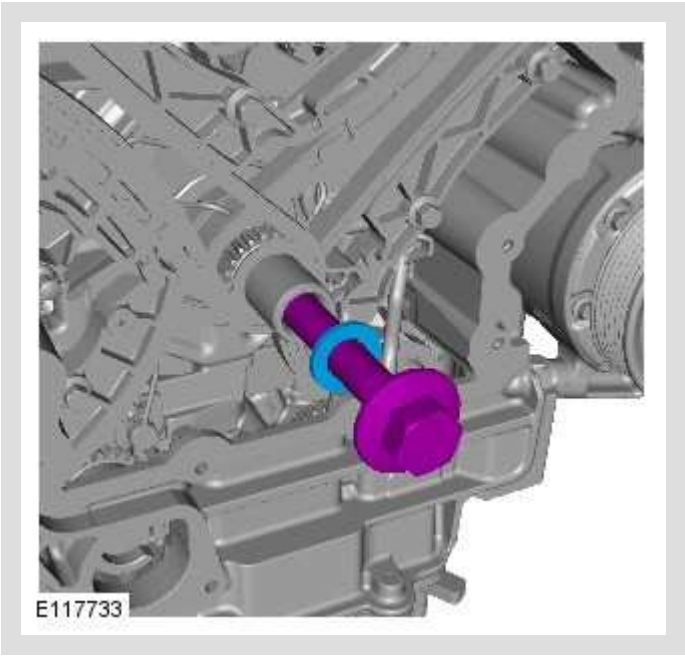
cardiagn.com



Install the special tool.

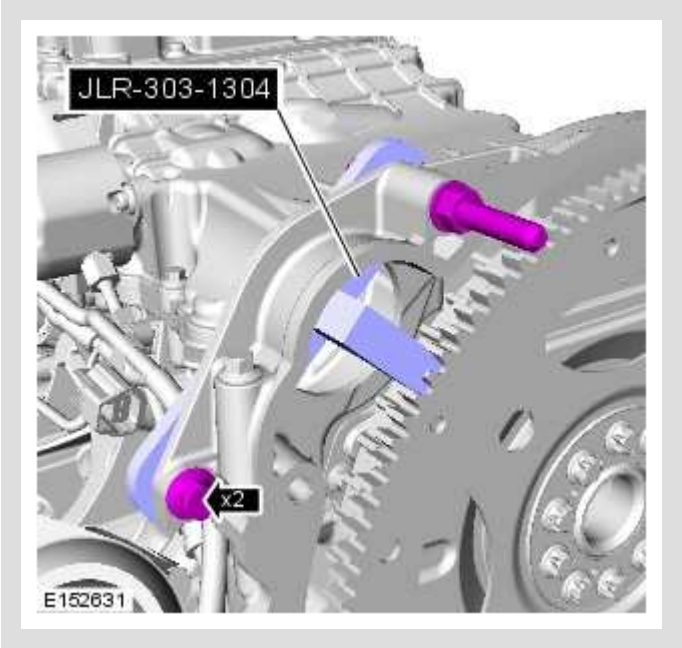
Special Tool(s): JLR-303-1304

55.



56.

cardiagn.com



Remove the special tool.
Special Tool(s): JLR-303-1304

57. Install the timing cover.
Refer to: Timing Cover (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

58. Install the starter motor
Refer to: Starter Motor (303-06A, Removal and Installation).
Refer to: Starter Motor (303-06B, Removal and Installation).

59. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

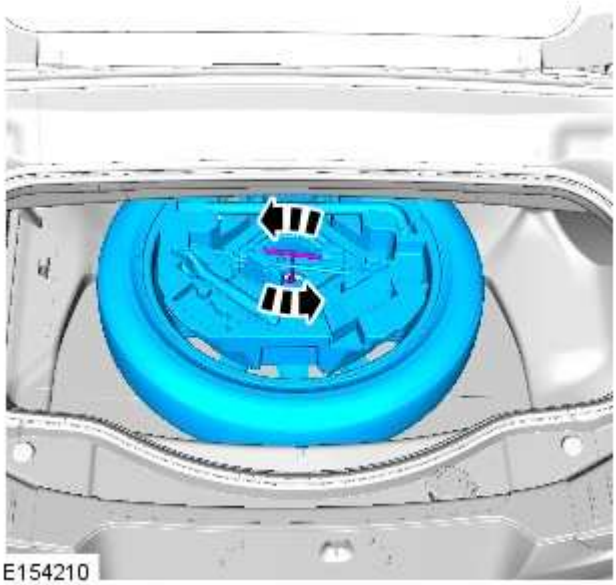
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

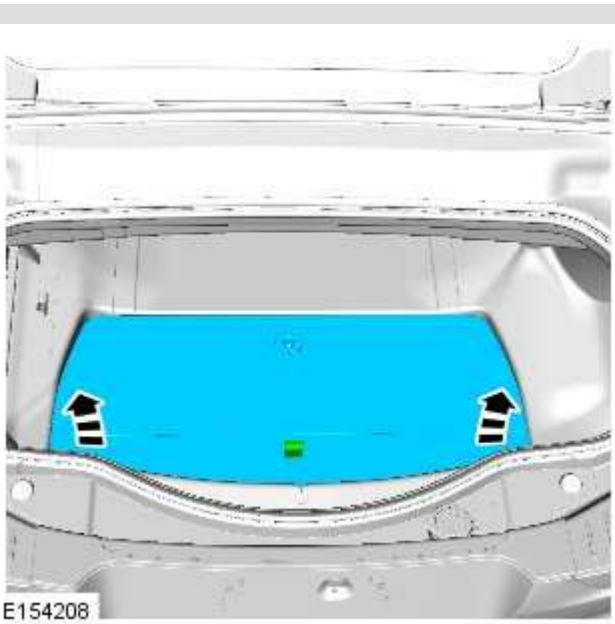
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

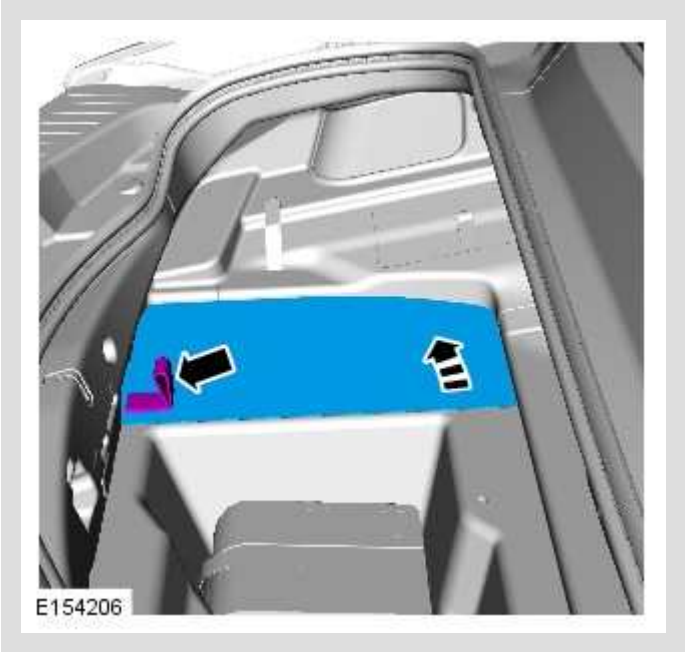

E154210

4.


E154208

5.

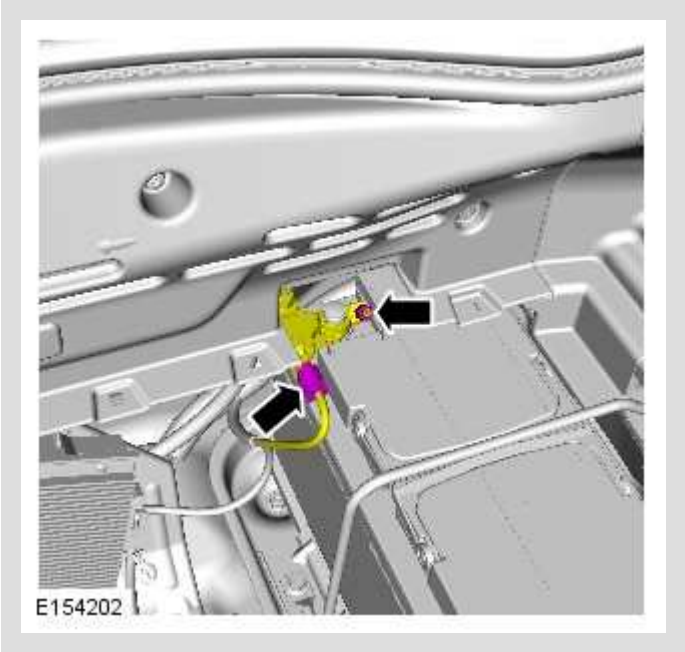
cardiagn.com



6.

CAUTION:

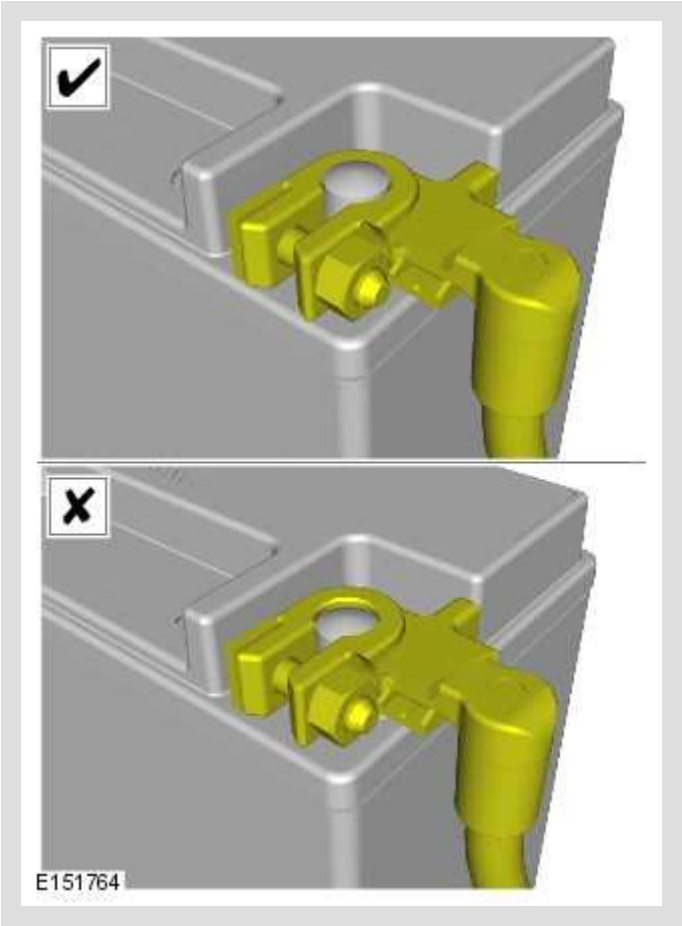
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

CAMSHAFT RH (G1584101)

REMOVAL AND INSTALLATION

12.13.18	CAMSHAFT - BANK 1 SET - RENEW	3000 CC, AJ V6 (AJ126)	17.8	USED WITHINS	

REMOVAL

CAUTION:

Make sure that the orientation and code on the top of the camshaft bearing caps is noted (along with the bank - A or B), so that on installation the components are installed to their original position. Failure to follow this instruction may cause damage to the vehicle.

NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

cardiagn.com

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

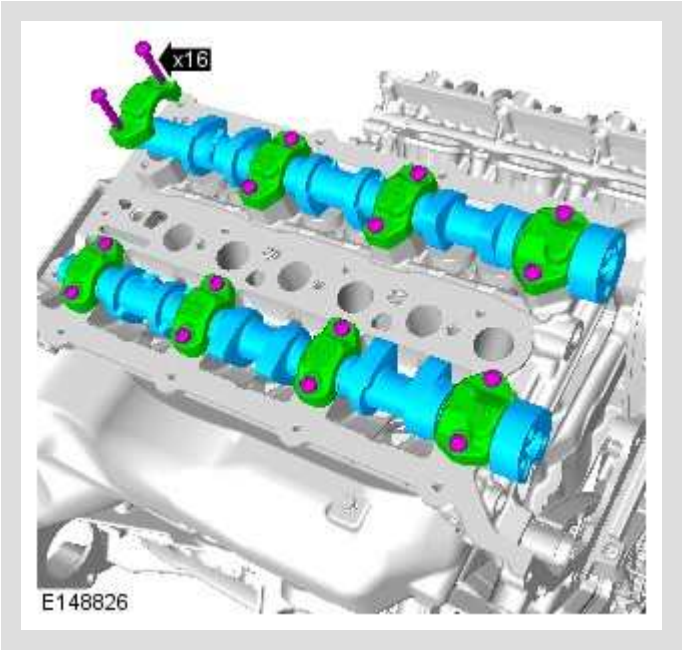
4. **CAUTIONS:**

   - Rotate the camshafts until all the valves are at their minimum open point.
   - Evenly and progressively, release the camshaft bearing caps.

   NOTE:

   Remove the camshaft bearing caps. Note: their position, orientation and markings. Each is marked with its position (number) and an orientation (arrow).

cardiagn.com



INSTALLATION

1.

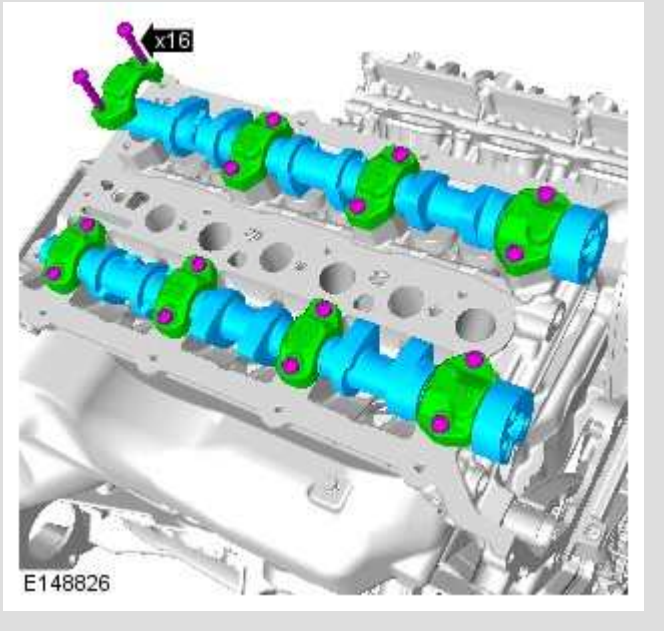
CAUTIONS:

- Prior to installing the camshafts, position the crankshaft 45 degrees ATDC cylinder 1A to prevent valve/piston collision.
- Evenly and progressively install and tighten the camshaft bearing caps.
- Make sure that the camshafts and camshaft bearing caps are installed in their original locations.

cardiagn.com

NOTE:

Lubricate the camshafts and the camshaft bearing caps with EP90 oil (or 75/90 viscosity oil will suffice) prior to installation.



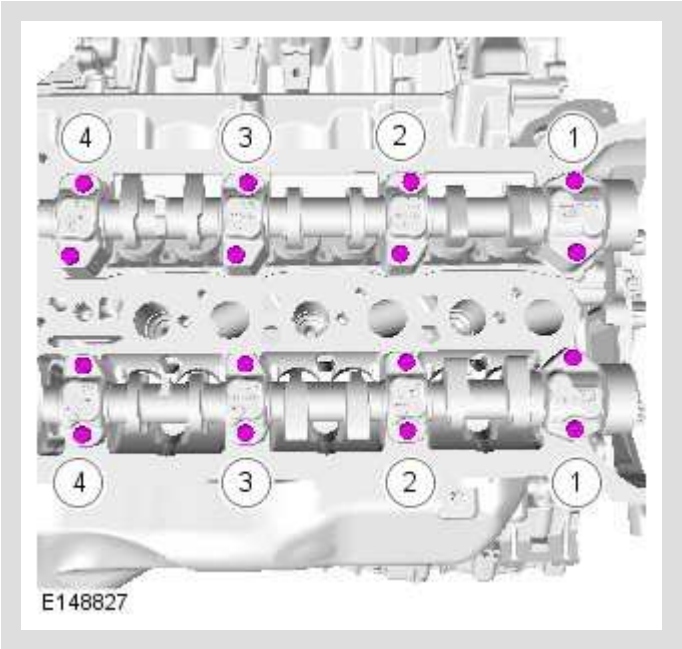
Torque: **3 Nm**

2.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com



Torque: **12 Nm**

3.

CAUTION:

Only rotate the crankshaft clockwise.

Rotate the crankshaft until the camshaft lobe on the valve being checked is 180 degrees from the maximum opening position.

4.

cardiagn.com

NOTE:

If the valve clearance is incorrect, continue to the next step. If the valve clearance is correct, continue to step 8.

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

5. **CAUTIONS:**

- Use the following formula to calculate the required bucket thickness. Original thickness + measured clearance - desired clearance = required bucket thickness.
- Do not use a magnet to remove the tappet.

Remove the tappet and measure the thickness.

6. **NOTE:**

If a new tappet is installed then go back to step 1 of the install procedure.

Install a new tappet if required.

7. Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

8. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

9. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

TIMING DRIVE COMPONENTS (G1584118)

REMOVAL AND INSTALLATION

12.65.13	TIMING CHAINS, GEARS AND TENSIONERS - ENGINE SET - RENEW	3000 CC, AJ V6 (AJ126)	15.6	USED WITHINS	

SPECIAL TOOL(S)

303-1445

Timing Tool – Camshaft Alignment

cardiagn.com

303-1452

Camshaft Rotating Tool

303-1482

Tensioner Tool

JLR-303-1303

Timing Tool

cardiagn.com

E152576	**JLR-303-1304** Locking Tool

REMOVAL

CAUTION:

Check all timing components for wear and install new components if required.

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2.

WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

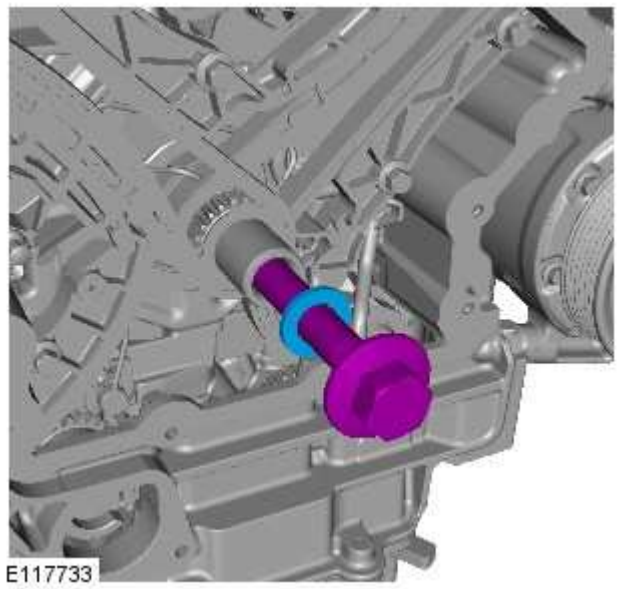
3. Remove the starter motor.
Refer to: Starter Motor (303-06A, Removal and Installation).
Refer to: Starter Motor (303-06B, Removal and Installation).

4. Remove the timing cover.
Refer to: Timing Cover (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

5.

CAUTION:

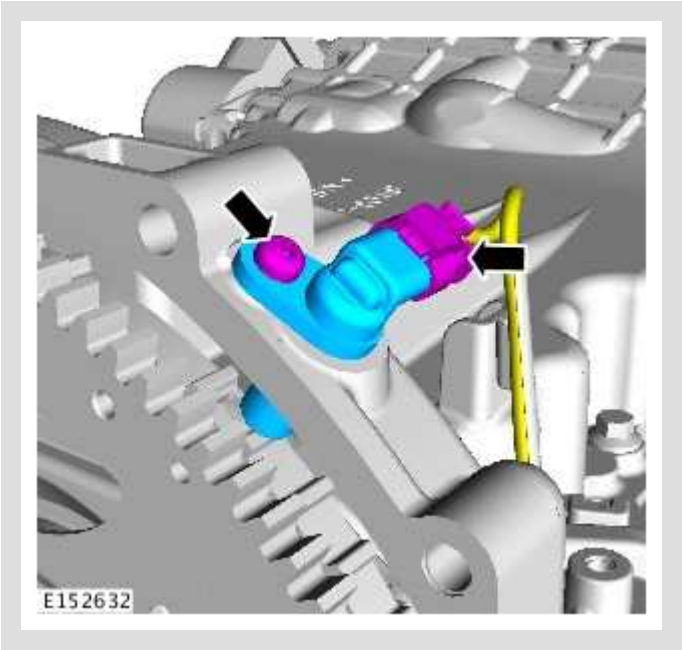
An M16 washer must be used to prevent damage to the crankshaft on installation.



Install the crankshaft pulley bolt.
Torque: **20 Nm**

6.

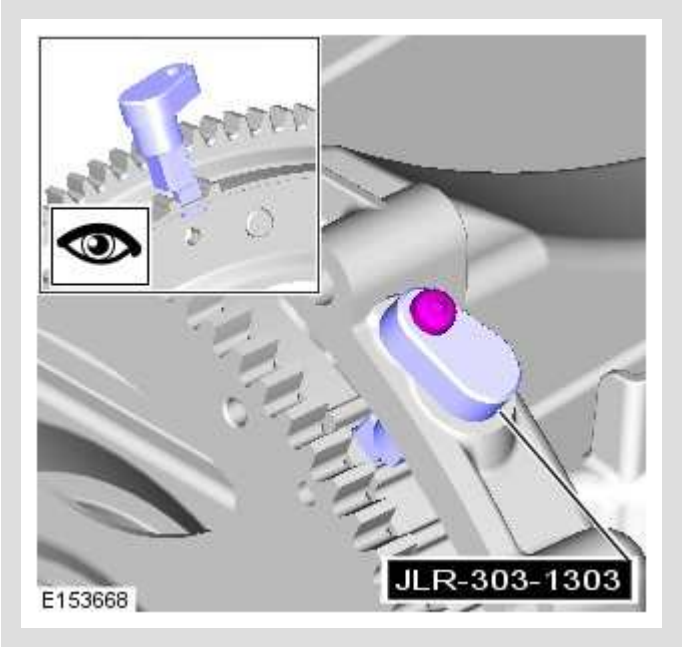
cardiagn.com



7.

CAUTION:

Only rotate the crankshaft clockwise.

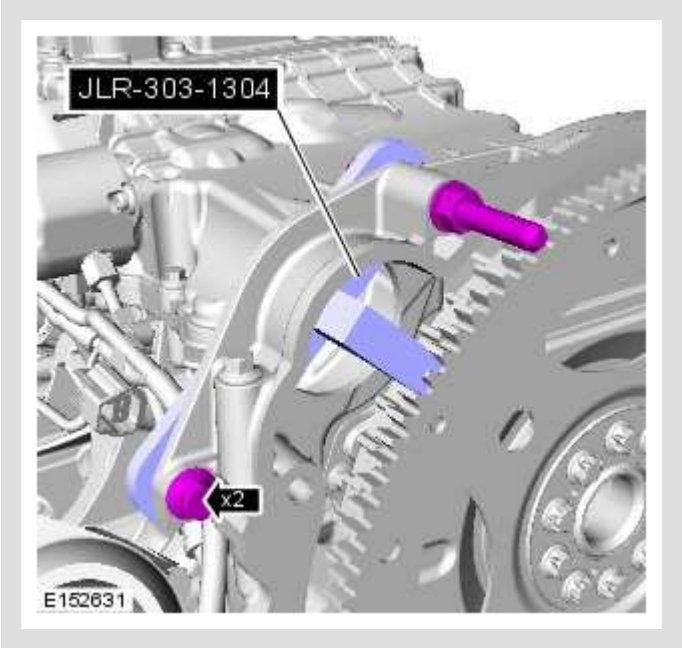


Install the special tool.

Special Tool(s): JLR-303-1303

8.

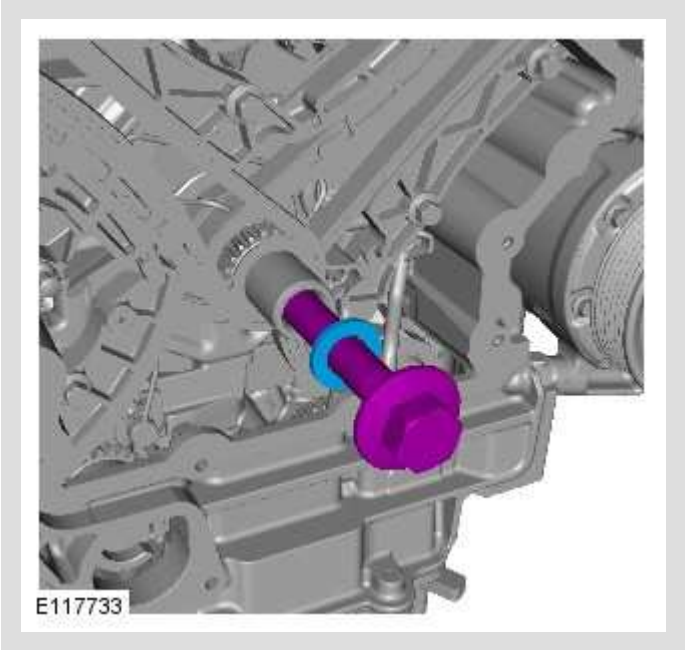
cardiagn.com



Install the special tool.

Special Tool(s): JLR-303-1304

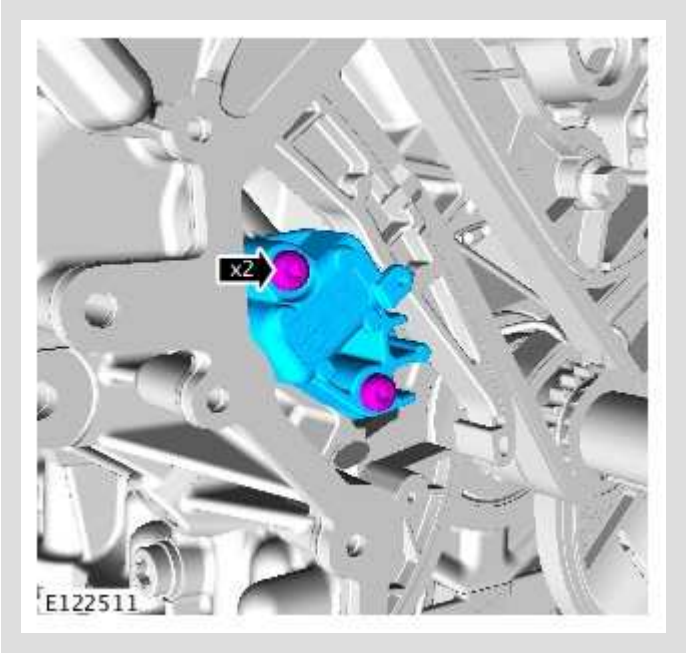
9.



Remove the crankshaft pulley bolt.

10.

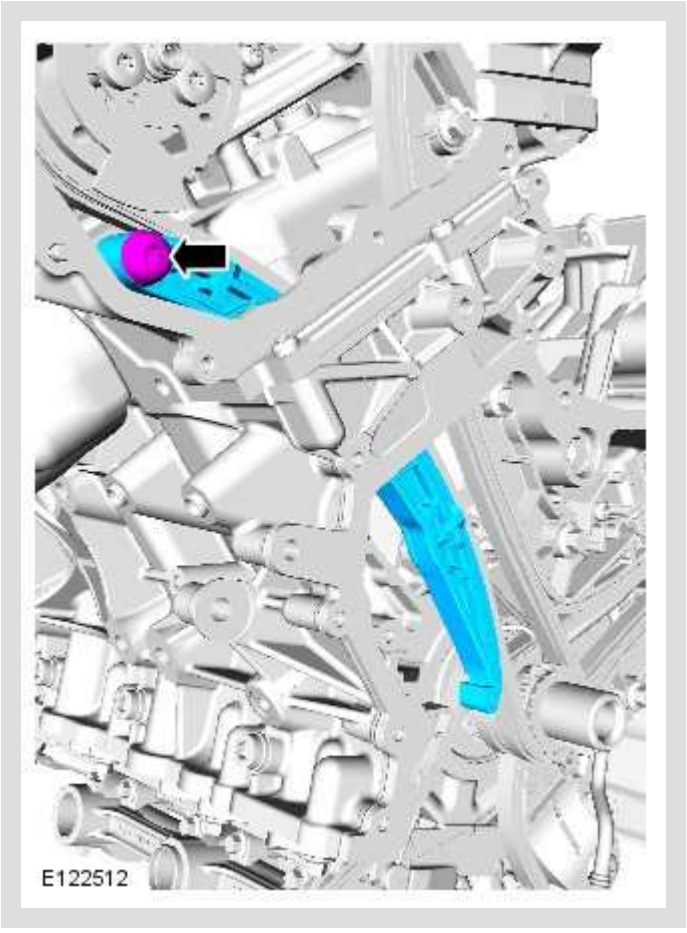
cardiagn.com



Remove the timing chain tensioner.

11.

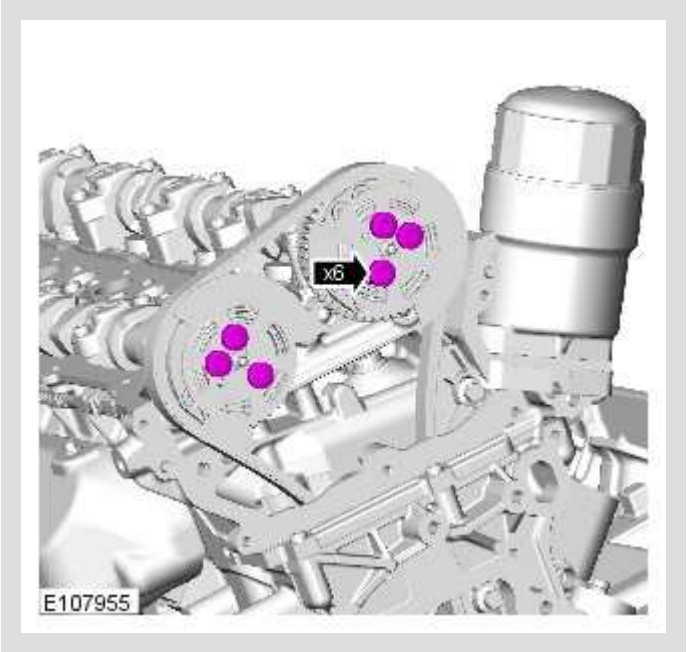
cardiagn.com



Remove the timing chain guide.

12.

cardiagn.com



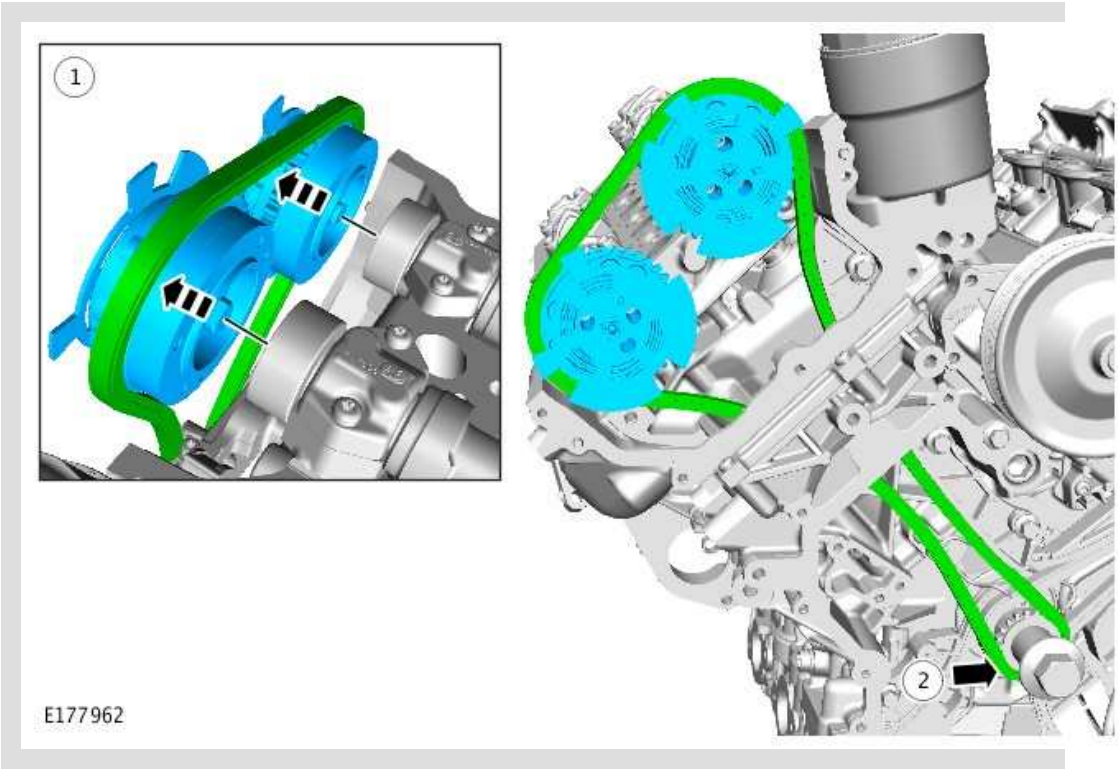
Remove the variable valve timing (VVT) unit bolts.

13.

CAUTION:

If the variable valve timing (VVT) units are knocked or dropped then new VVT(s) must be installed.

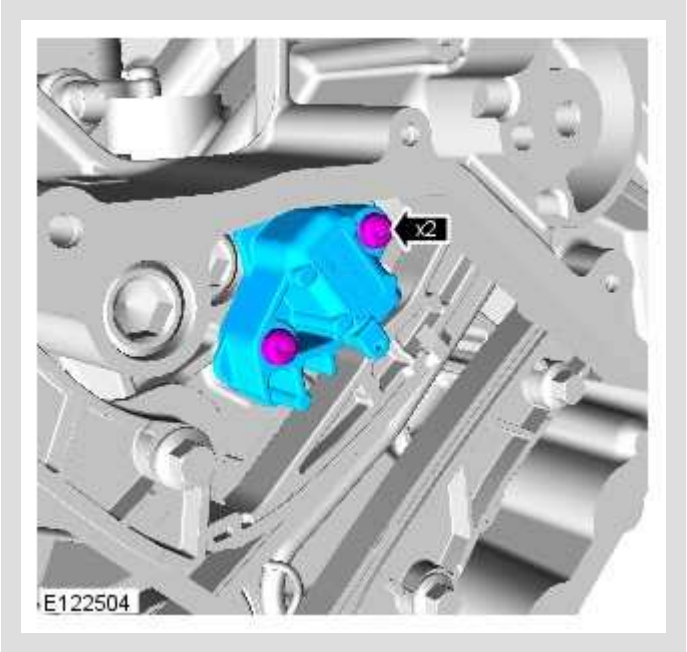
cardiagn.com



Remove the timing chain and VVT units.

14.

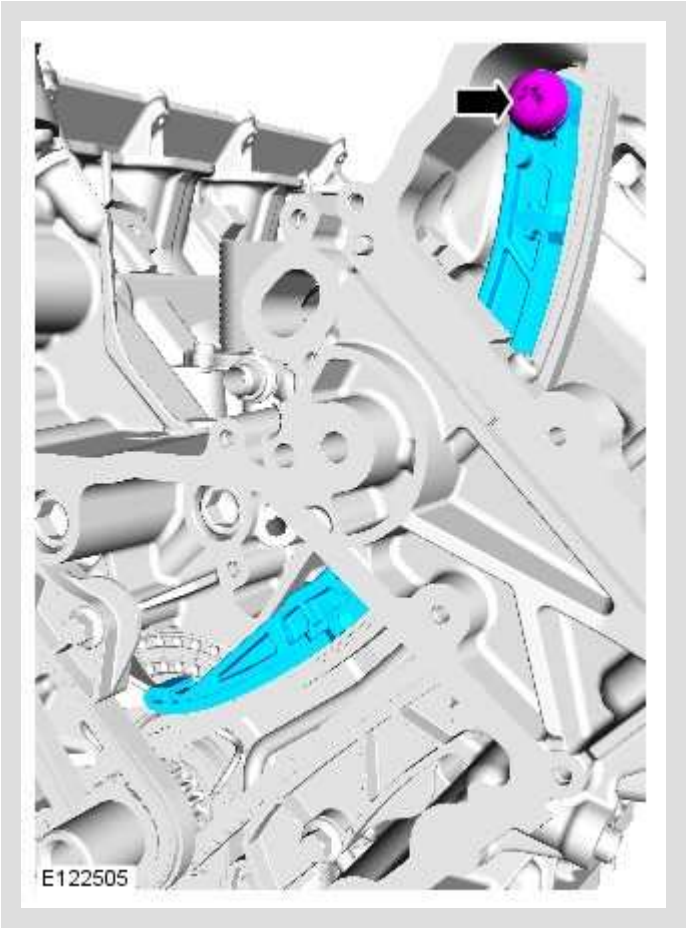
cardiagn.com



Remove the timing chain tensioner.

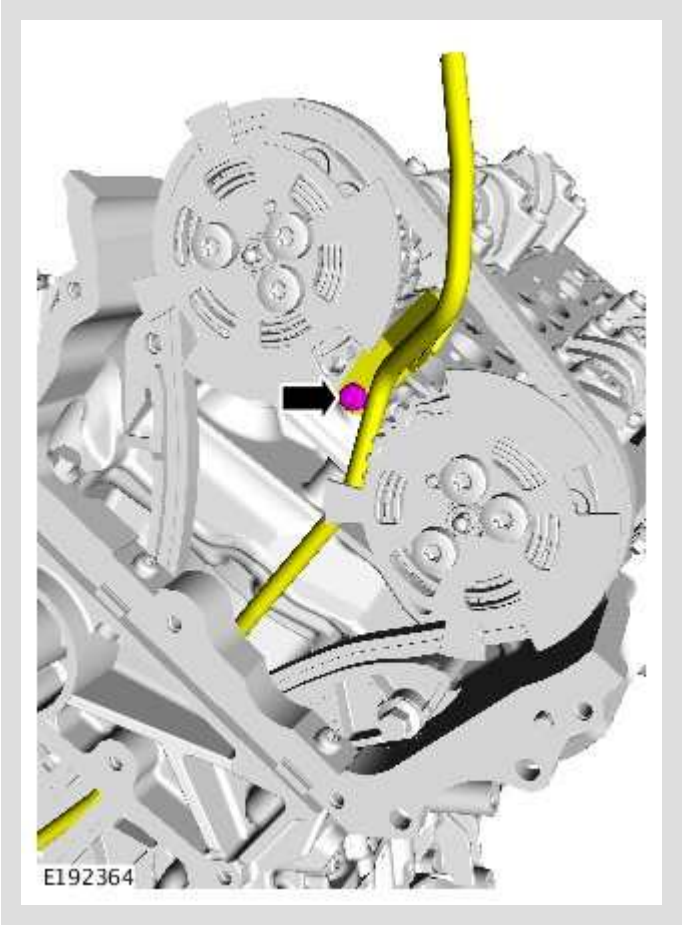
15.

cardiagn.com



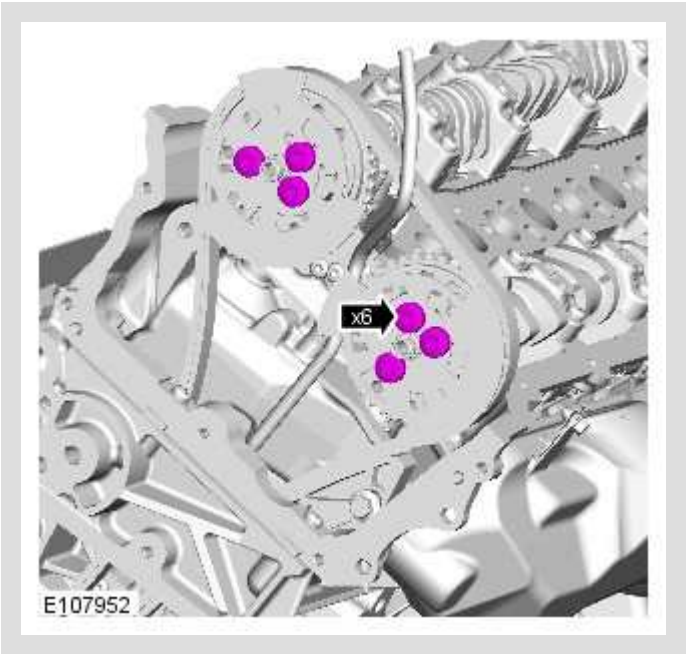
Remove the timing chain guide.

cardiagn.com



Release the oil drain tube.

17.



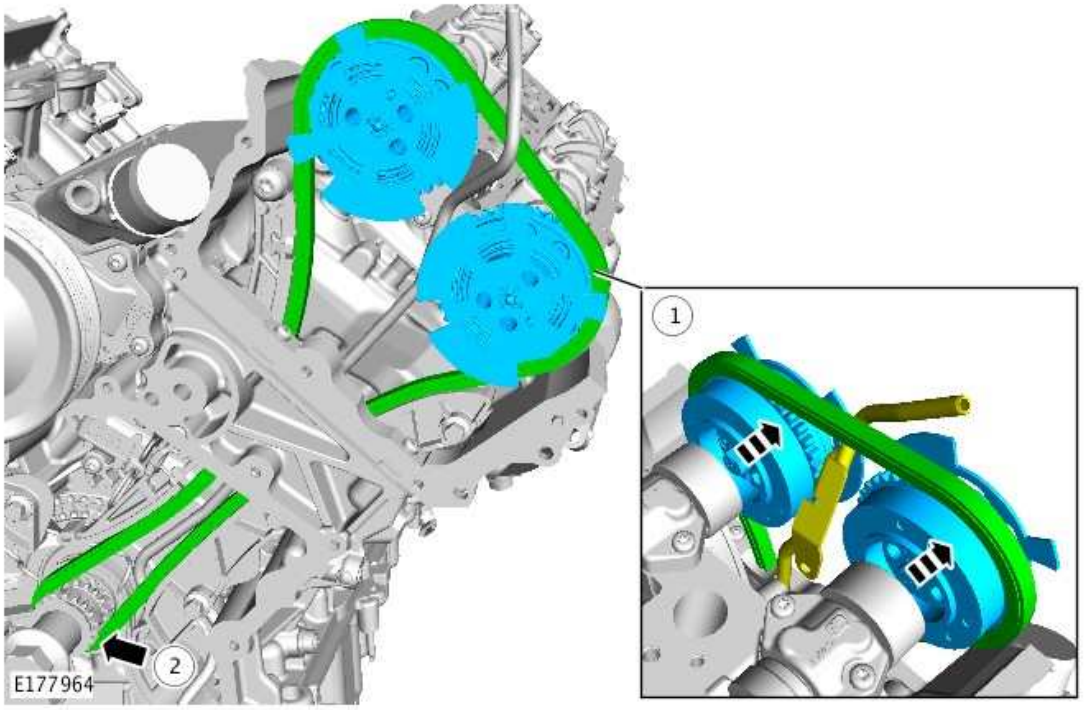
Remove the variable valve timing (VVT) unit bolts.

18.

cardiagn.com

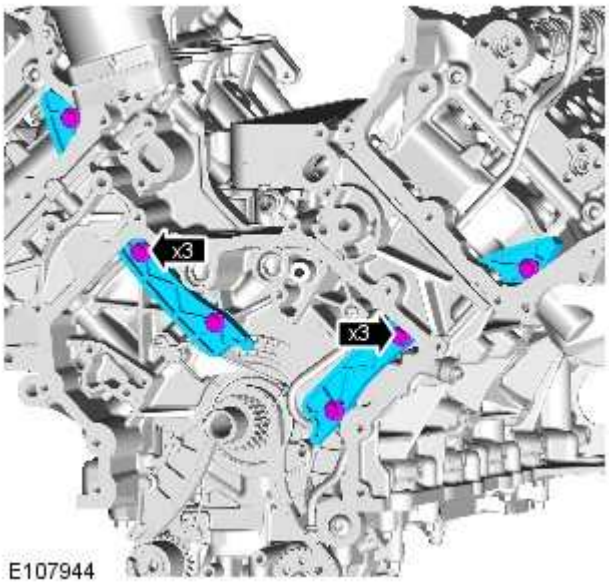
CAUTION:

If the VVT is knocked or dropped then new VVT(s) must be installed.



Remove the timing chain with the VVT units.

19.

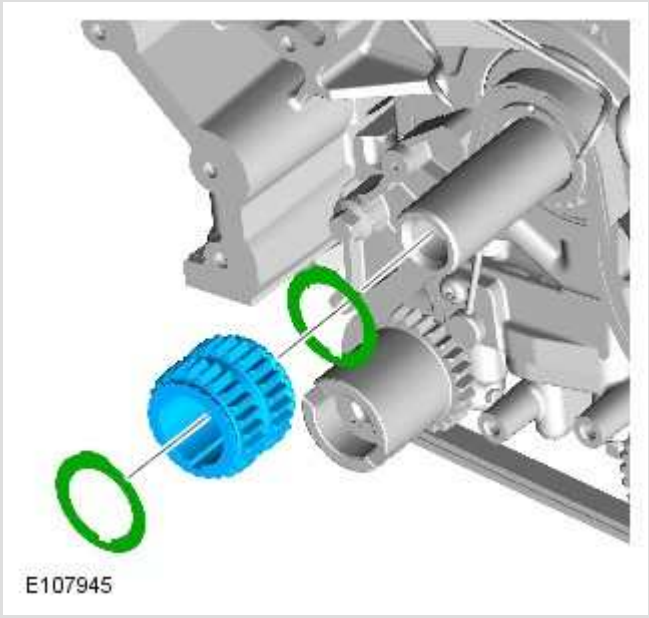


20.

cardiagn.com

CAUTION:

Discard the friction washer.



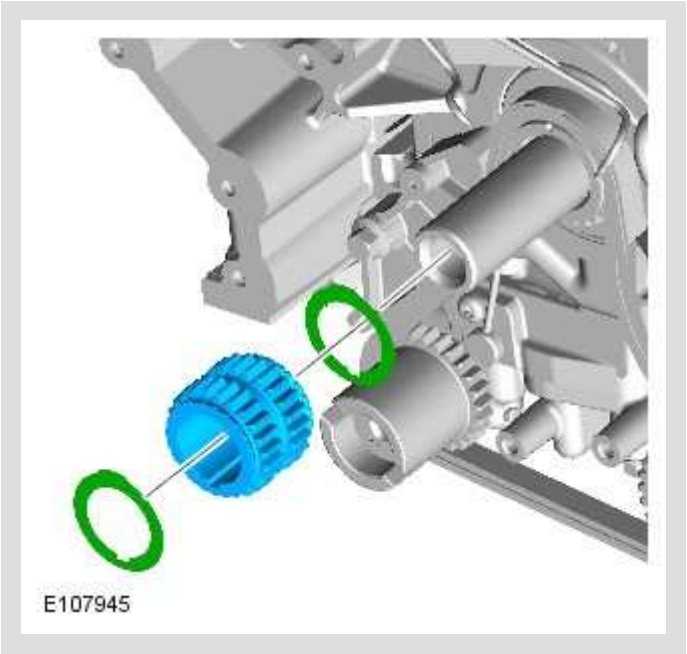
INSTALLATION

1.

CAUTION:

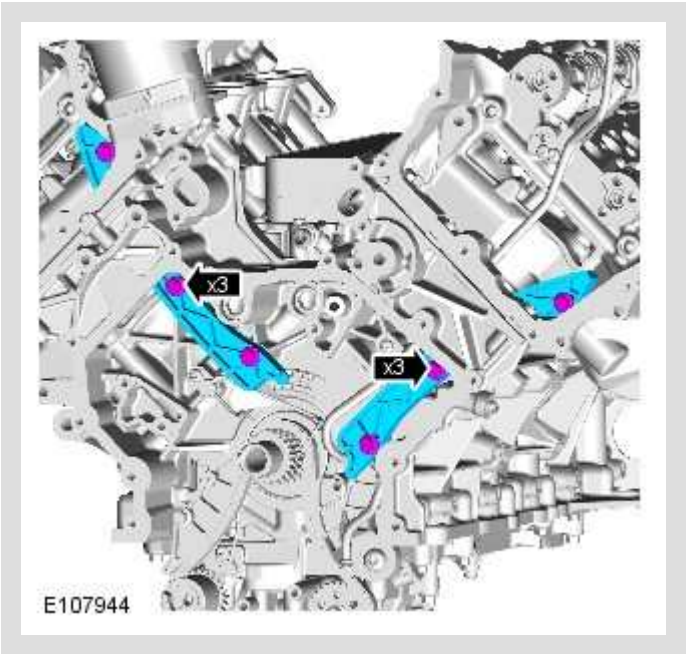
Install a new friction washer.

cardiagn.com



2.

cardiagn.com

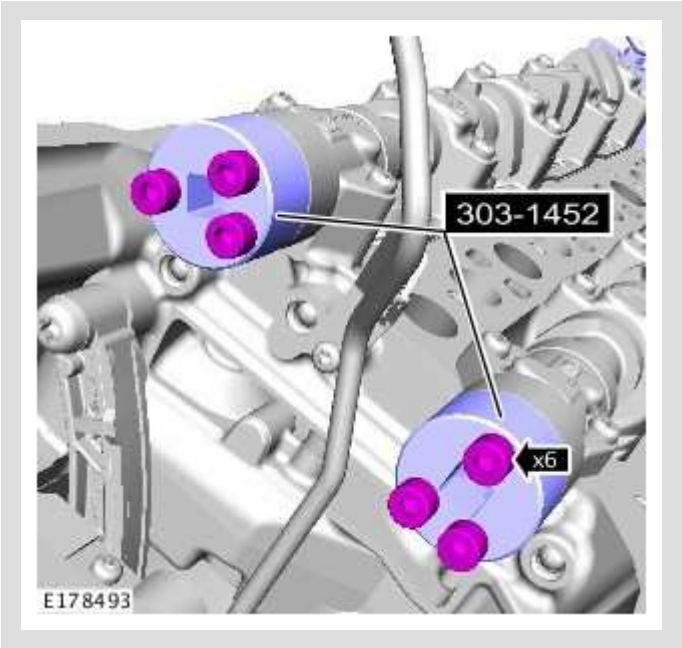


Install the timing chain fixed guides.

Torque: **12 Nm**

3.

cardiagn.com



Install the special tool to each Camshaft.

Special Tool(s): 303-1452

Torque: **10 Nm**

4.

cardiagn.com

Carefully rotate the camshafts if the position is not as shown.

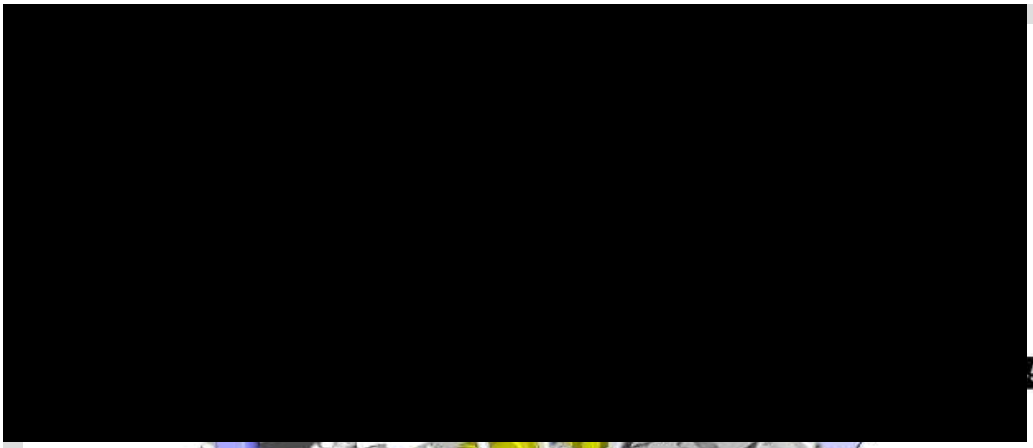
5.

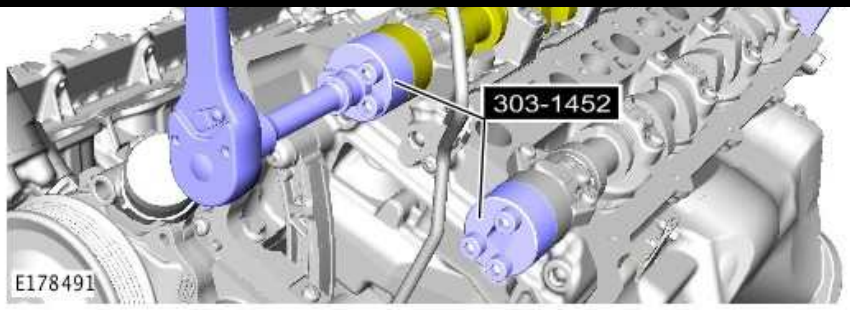
CAUTIONS:

Do not overturn the camshafts.

Tighten the wing nuts finger tight. Failure to follow this instruction may result in damage to the components.

cardiagn.com

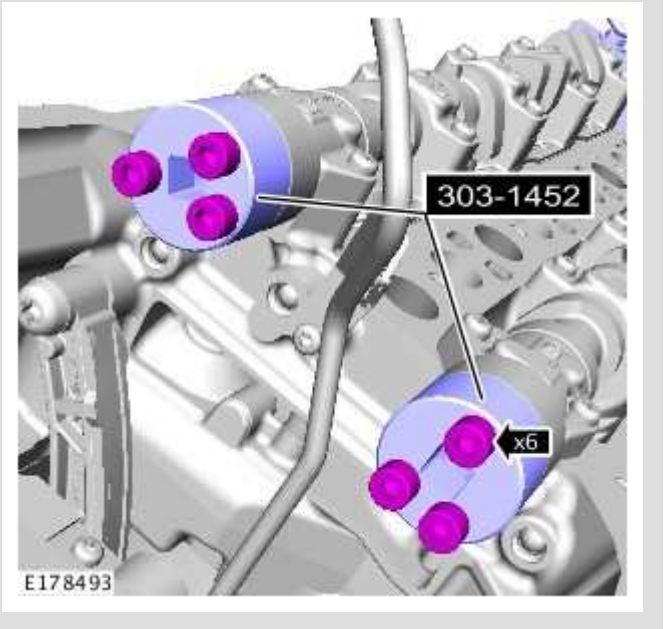




Special Tool(s): 303-1452

Using a suitable tool, carefully rock the camshaft clockwise then anti-clockwise. Turn the special tool locking nuts until there is no movement left in camshafts. Repeat this step for both camshafts.

6.



cardiagn.com

Remove the special tool from each Camshaft.

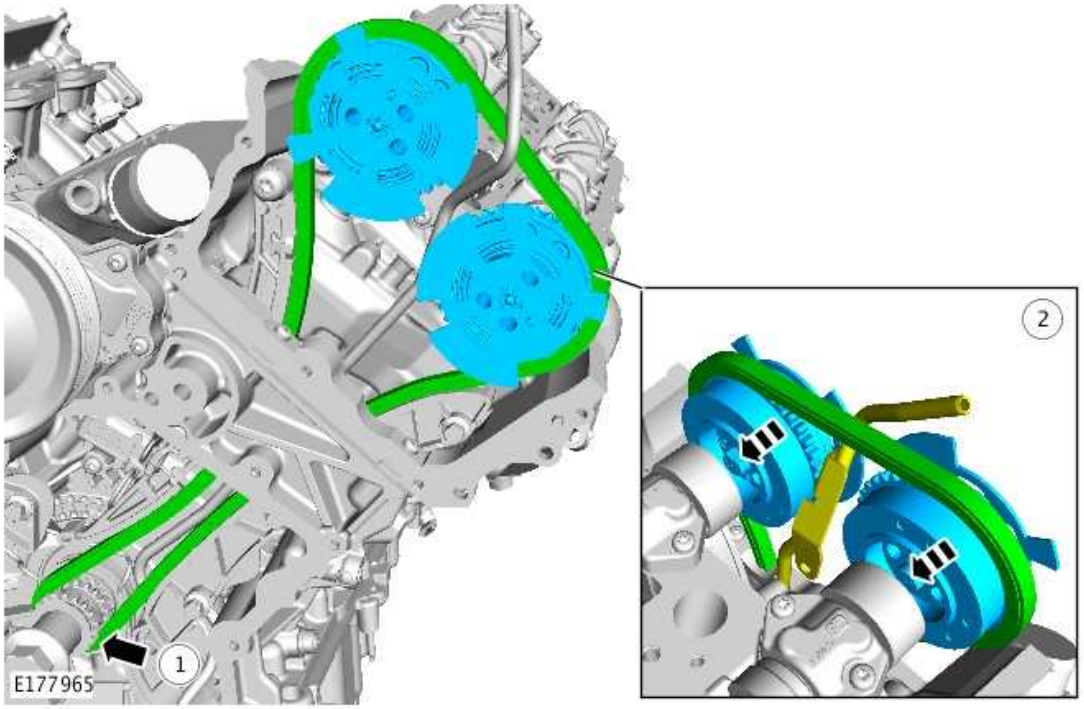
Special Tool(s): 303-1452

7.

CAUTIONS:

Do not allow the camshaft to rotate.

If the VVT is knocked or dropped then new VVT(s) must be installed.



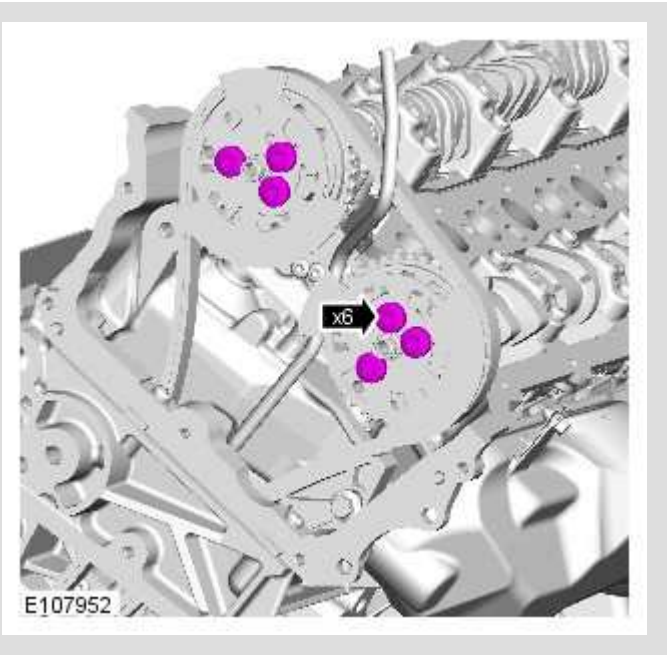
Install the timing chain with the VVT units.

8.

NOTE:

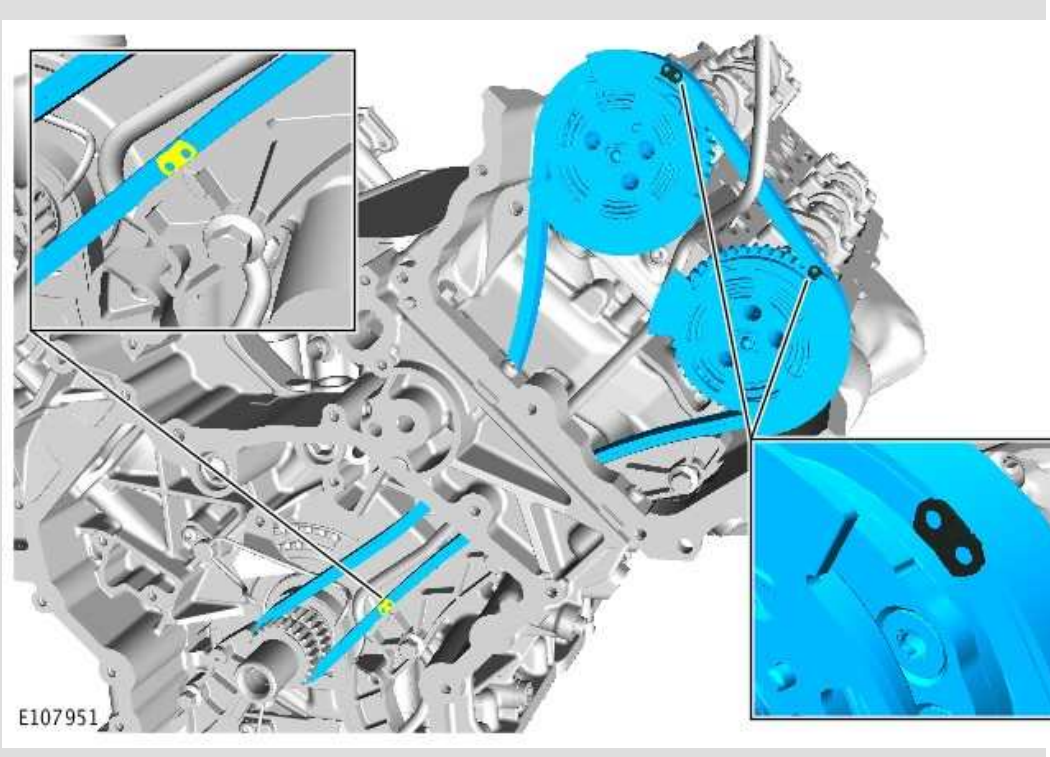
Install the bolts finger tight at this stage.

cardiagn.com



Install the variable valve timing (VVT) unit bolts.

9.



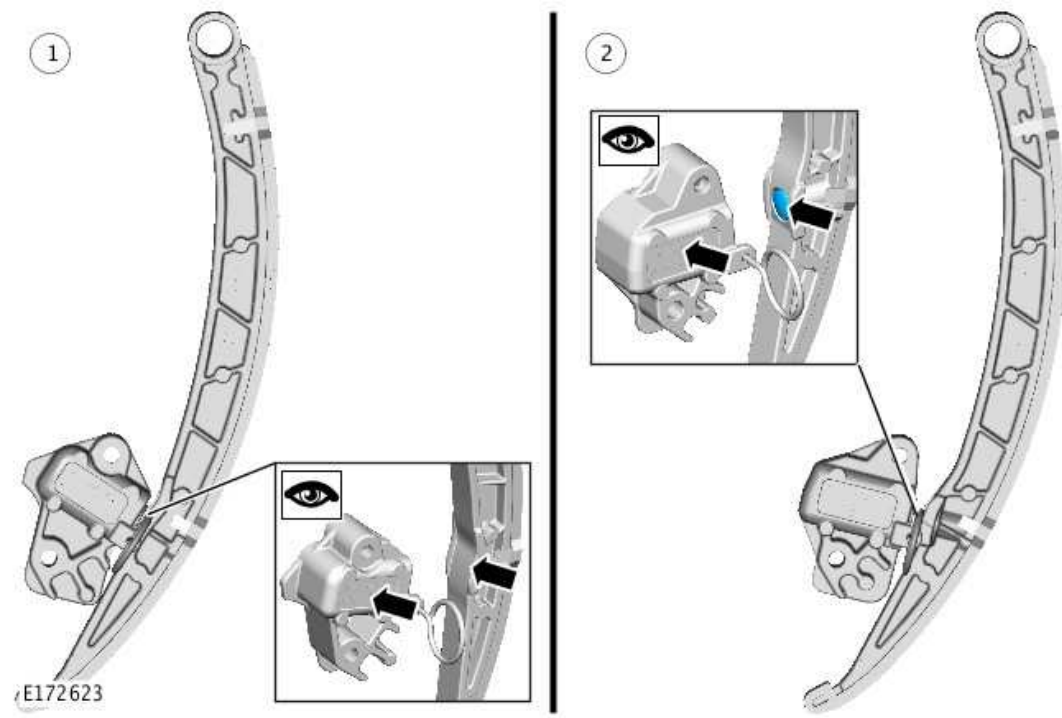
Make sure that all the timing chain alignment marks are in the positions shown.

cardiagn.com

10.

CAUTIONS:

- If the vehicle is fitted with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



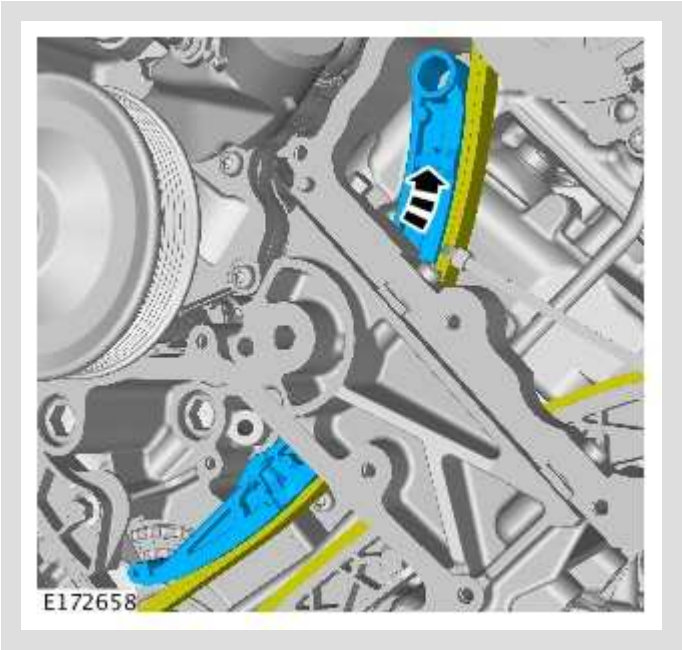
Using the illustration, identify which timing chain tensioner and guide is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only.

11.

CAUTION:

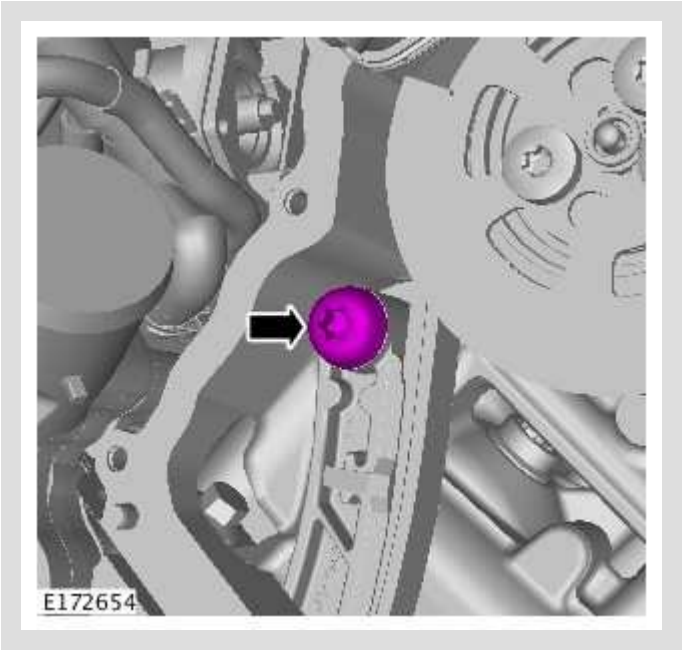
Make sure that a new component is installed.

cardiagn.com



Install the timing chain guide.

12.



Install the timing chain guide bolt.

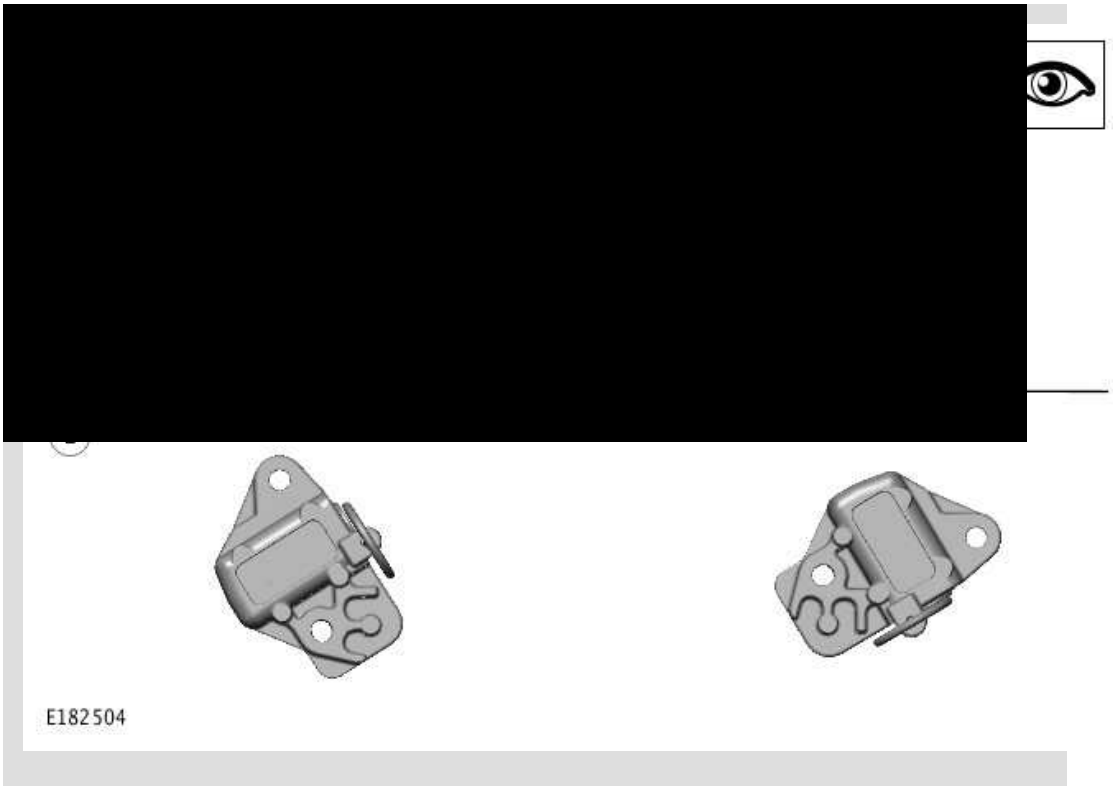
Torque: **25 Nm**

13.

cardiagn.com

CAUTIONS:

- If the vehicle is Installed with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



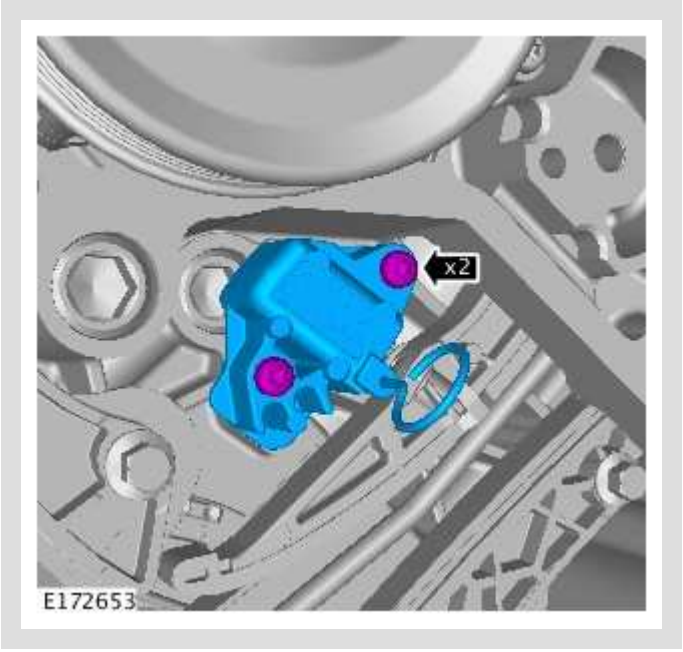
Before installing the timing chain tensioners, use the illustration shown to identify which timing chain tensioner is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only. If a new timing chain tensioner is installed, do not deploy the tensioner pin and proceed to the next step. If the tensioner to be installed has previously been deployed, make sure the attached animation is followed to make sure the tensioner is set correctly, failure to do this may result in damage to the engine.

cardiagn.com

14.

CAUTION:

Do not release the timing chain tensioner locking pin at this stage.

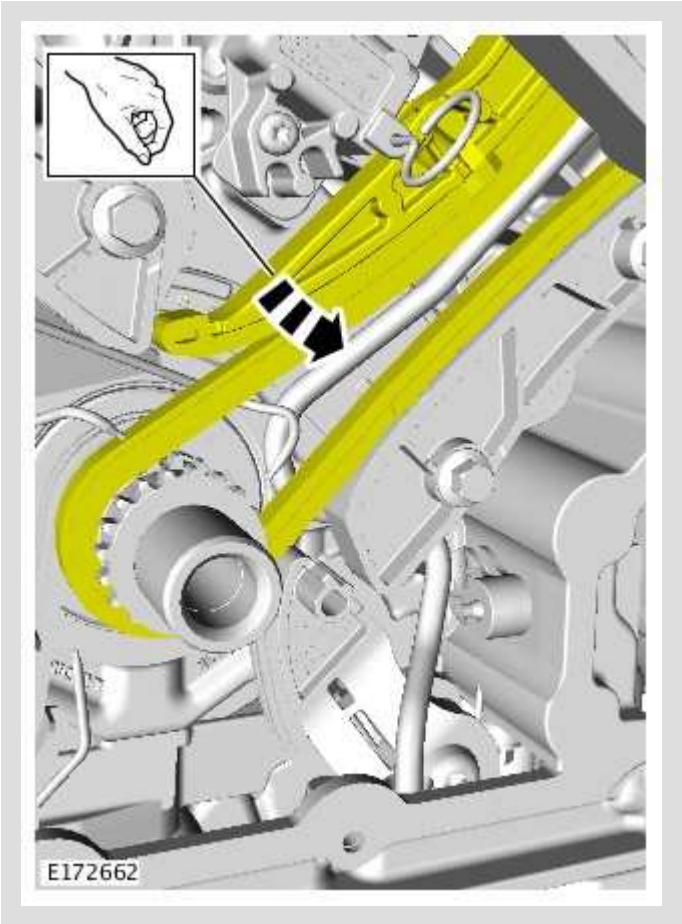


Install the timing chain tensioner.

Torque: **12 Nm**

15.

cardiagn.com

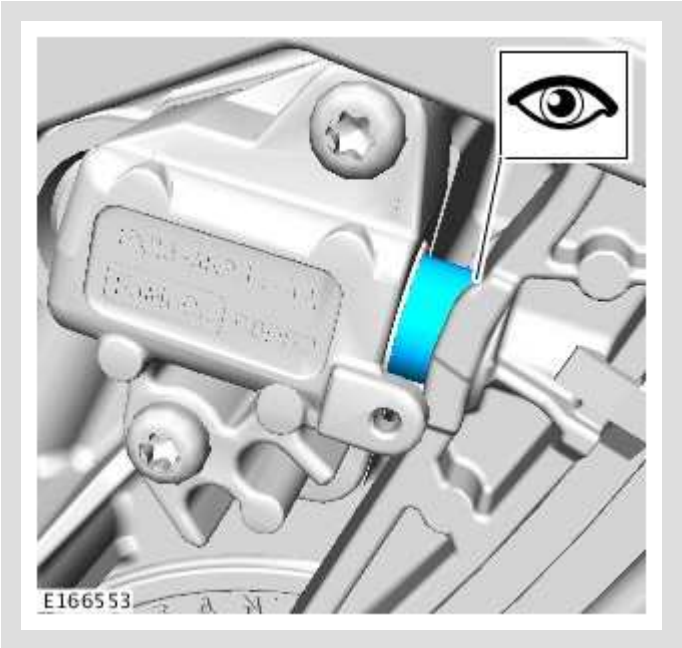


Apply and maintain tension on the component.

cardiagn.com

Remove the timing chain tensioner retaining pin and release the timing chain guide.

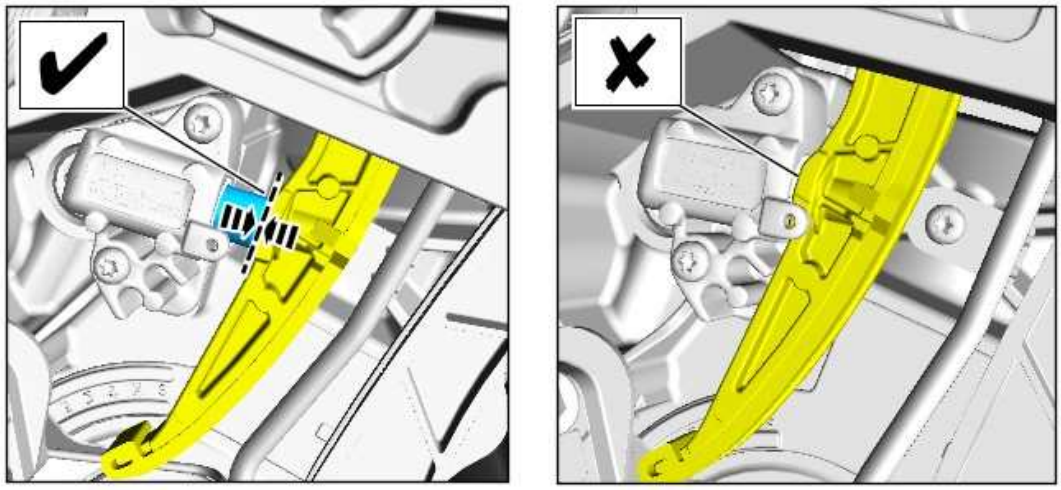
17.



The timing chain tensioner piston should apply tension to the timing chain guide.

18.

cardiagn.com

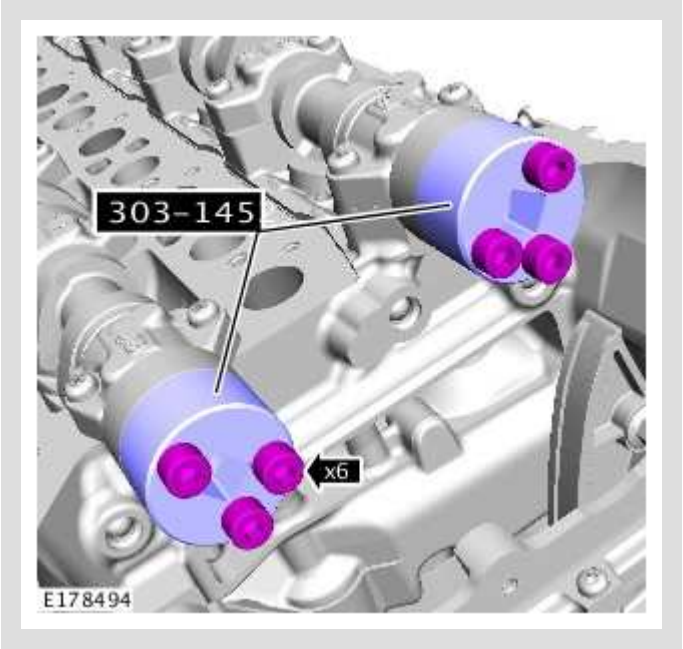


E166556

The timing chain tensioner must maintain tension on the chain guide. If the piston can be pushed back so the chain guide contacts with the body of the tensioner, the tensioner is not correct. Repeat steps 13-18.

19.

cardiagn.com



Install the special tool to each Camshaft.

Special Tool(s): 303-1452

Torque: **10 Nm**

20.

cardiagn.com

CAUTION:

Do not overturn the camshafts.

Carefully rotate the camshafts if the position is not as shown.

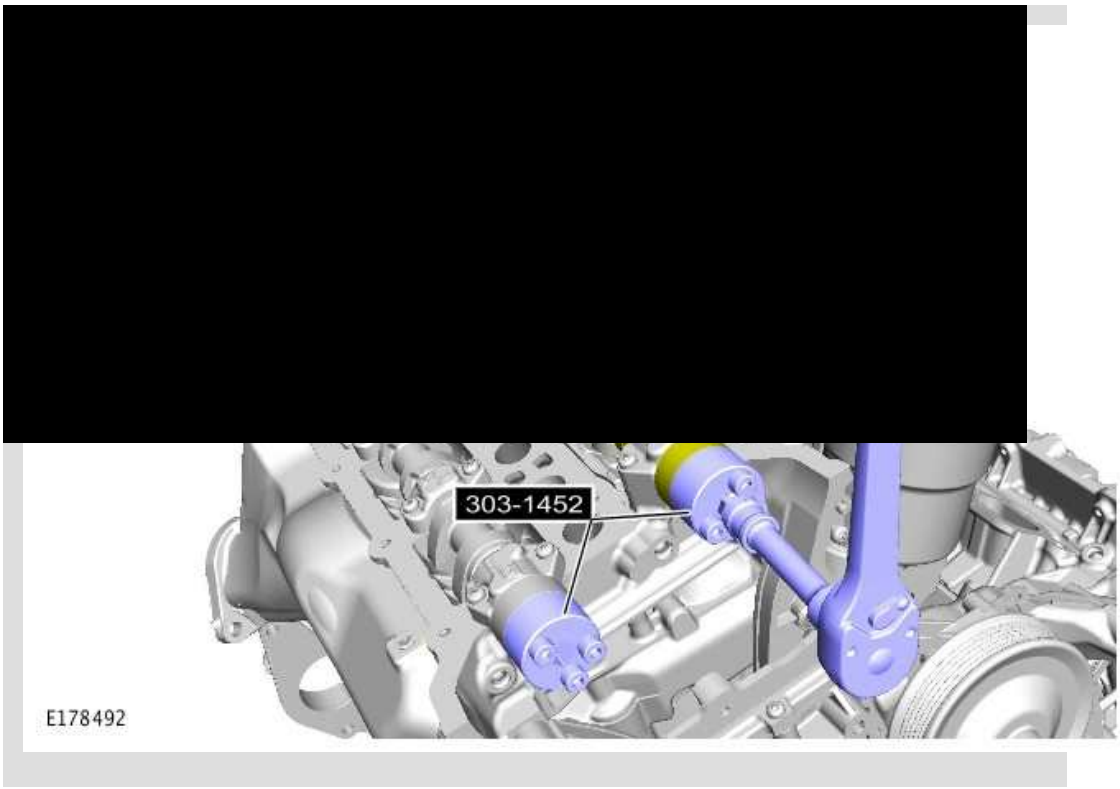
21.

cardiagn.com

CAUTIONS:

Do not overturn the camshafts.

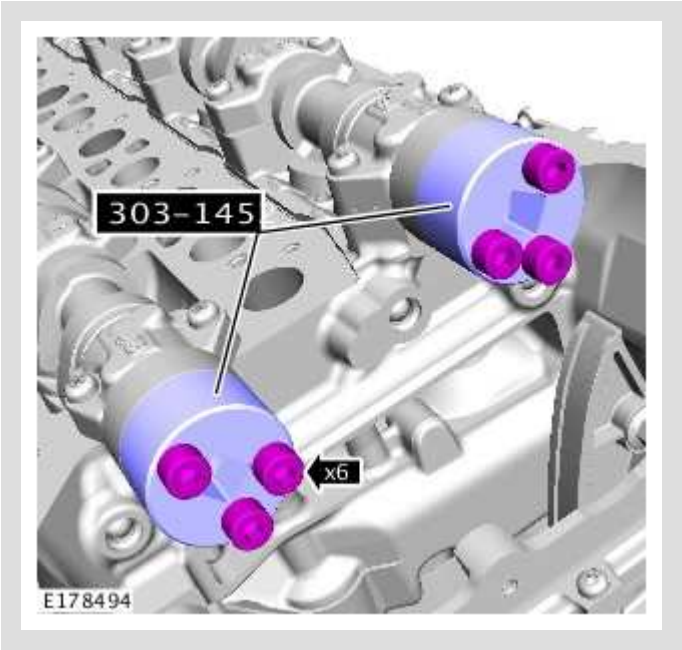
Tighten the wing nuts finger tight. Failure to follow this instruction may result in damage to the components.



Special Tool(s): 303-1452

Using a suitable tool, carefully rock the camshaft clockwise then anti-clockwise. Turn the special tool locking nuts until there is no movement left in camshafts. Repeat this step for both camshafts.

cardiagn.com



Remove the special tool from each Camshaft.

Special Tool(s): 303-1452

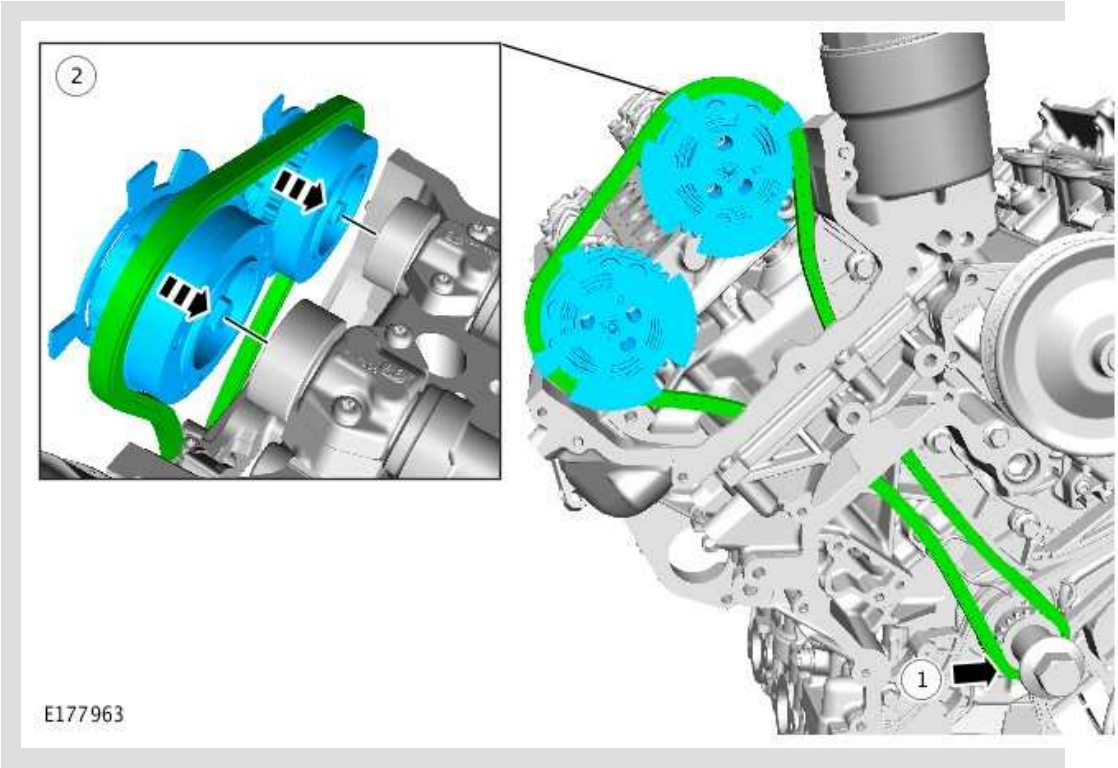
23.

CAUTIONS:

Do not allow the camshafts to rotate.

If the VVT is knocked or dropped then new VVT(s) must be installed.

cardiagn.com



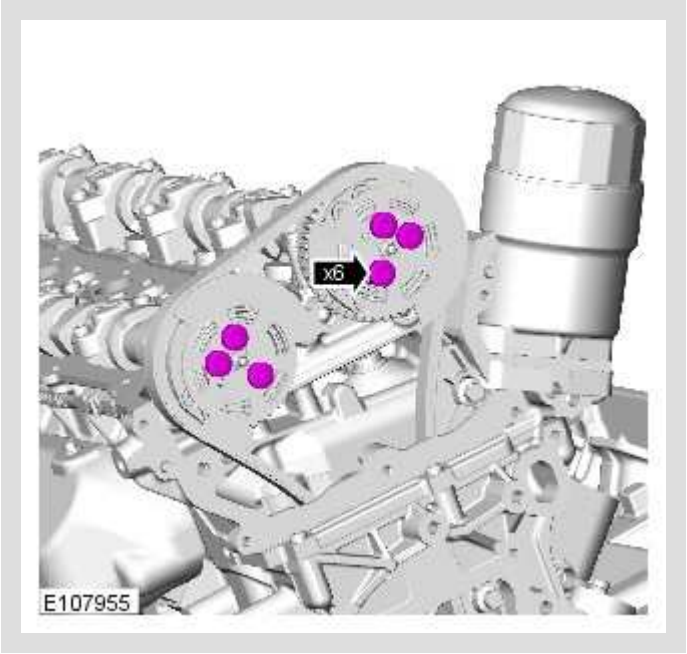
Install the timing chain with the VVT units.

24.

NOTE:

Install the bolts finger tight at this stage.

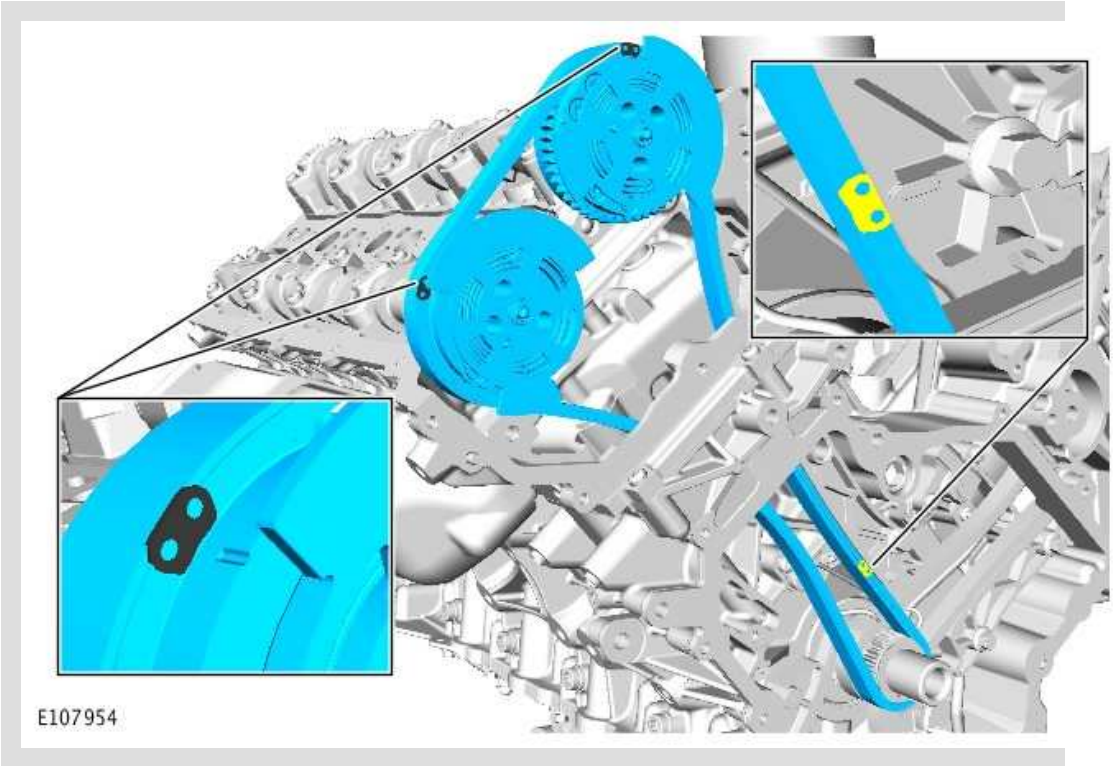
cardiagn.com



Install the variable valve timing (VVT) unit bolts.

25.

cardiagn.com

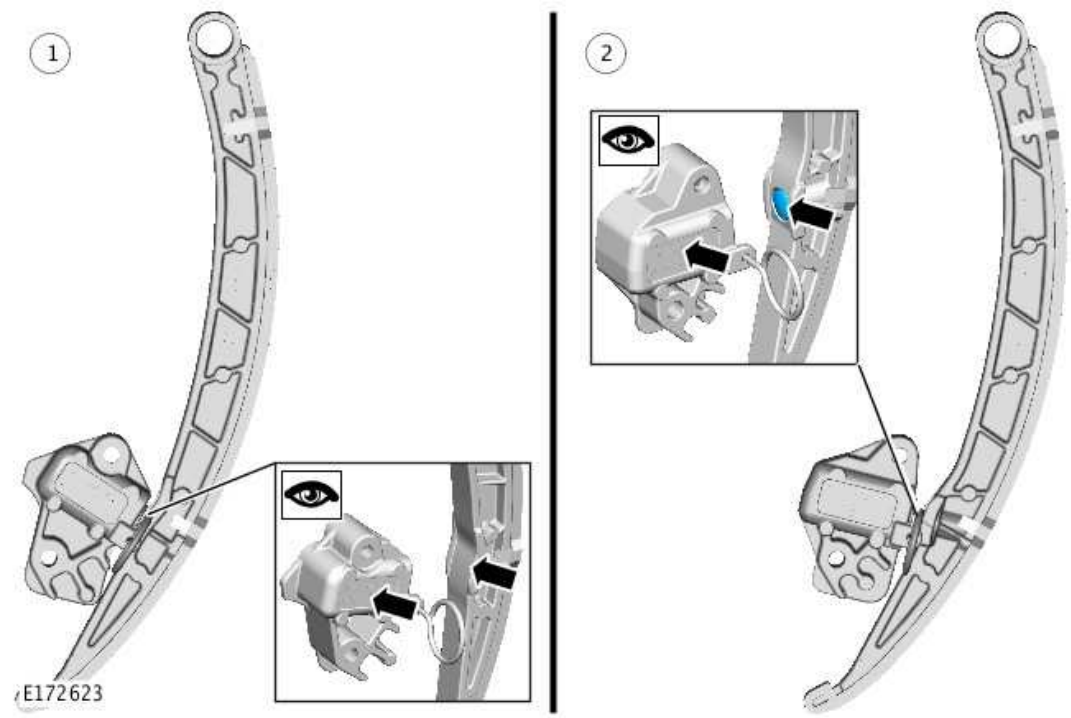


Make sure that all the timing chain alignment marks are in the positions shown.

cardiagn.com

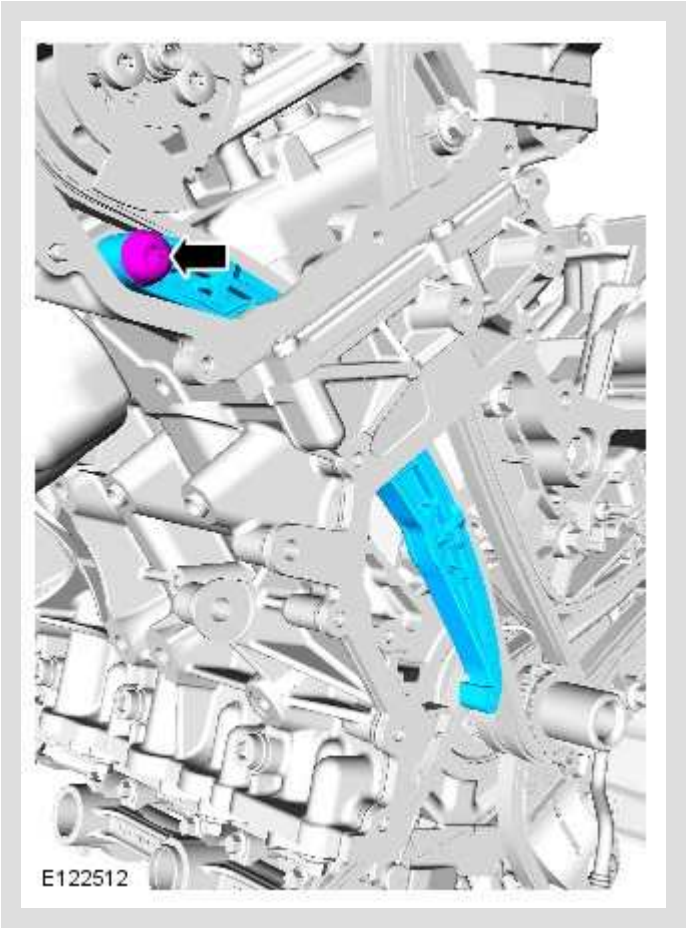
CAUTIONS:

- If the vehicle is fitted with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



Using the illustration, identify which timing chain tensioner and guide is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only.

cardiagn.com



Install the timing chain guide.

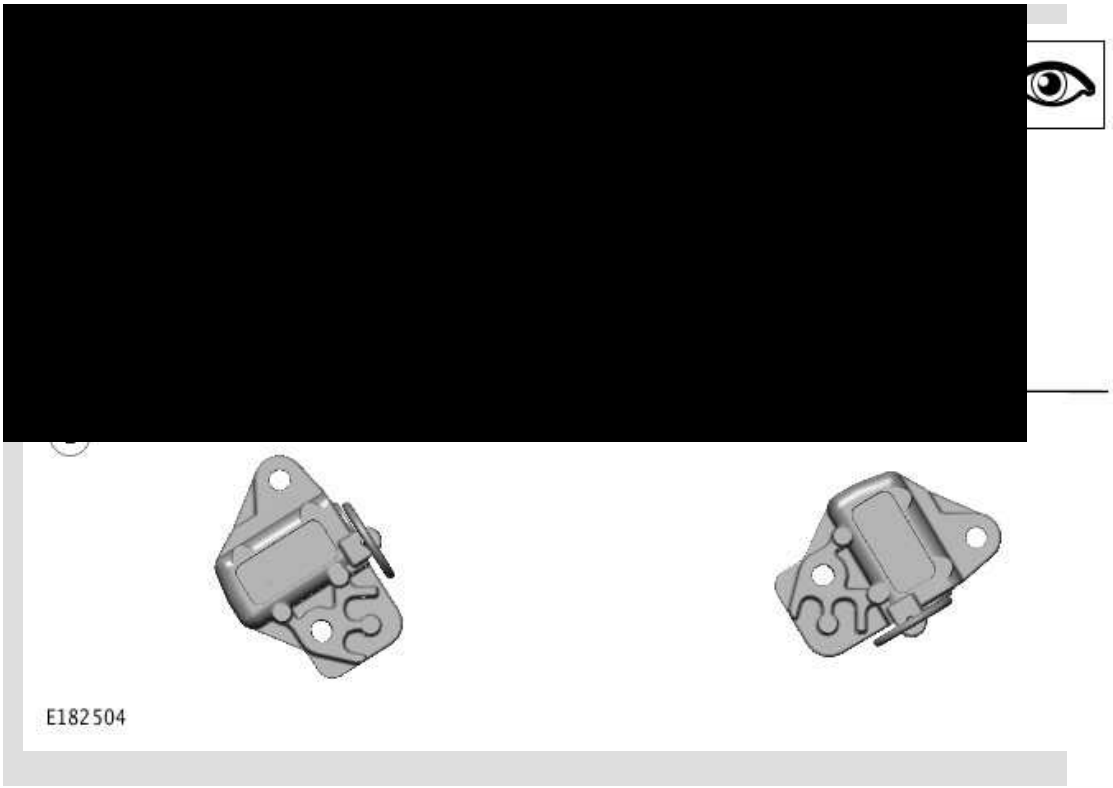
Torque: **25 Nm**

28.

cardiagn.com

CAUTIONS:

- If the vehicle is Installed with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



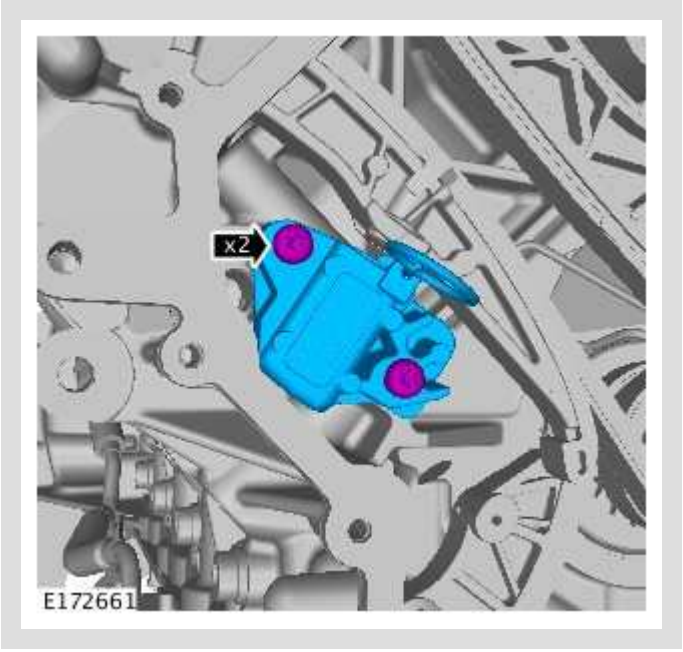
Before installing the timing chain tensioners, use the illustration shown to identify which timing chain tensioner is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only. If a new timing chain tensioner is installed, do not deploy the tensioner pin and proceed to the next step. If the tensioner to be installed has previously been deployed, make sure the attached animation is followed to make sure the tensioner is set correctly, failure to do this may result in damage to the engine.

cardiagn.com

29.

CAUTION:

Do not release the timing chain tensioner locking pin at this stage.

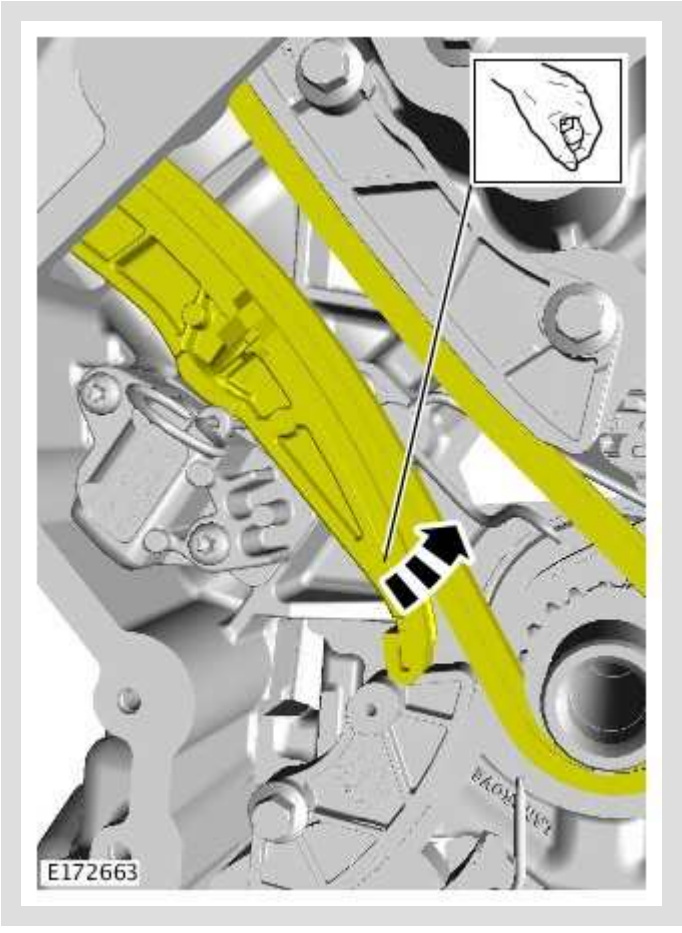


Before installing the timing chain tensioners, make sure the attached animation is followed to ensure the tensioner is set correctly, failure to do this may result in damage to the engine.

Torque: **12 Nm**

30.

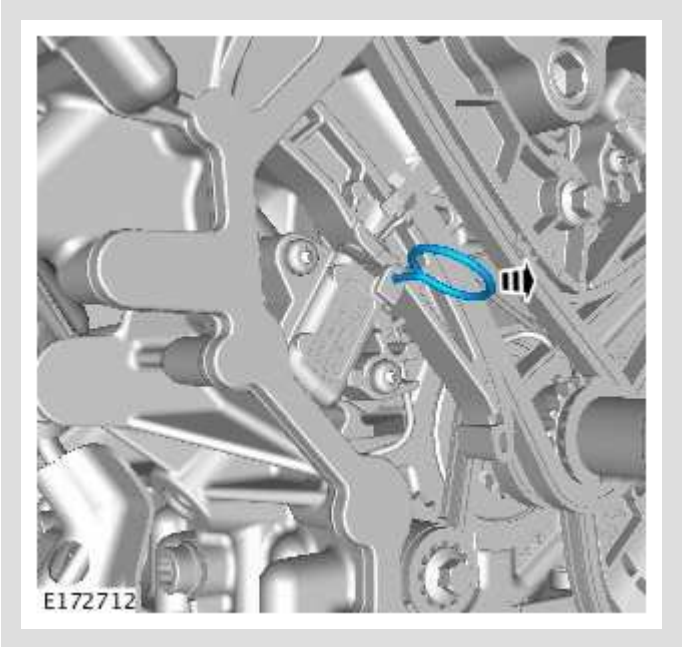
cardiagn.com



Apply and maintain tension on the component.

31.

cardiagn.com



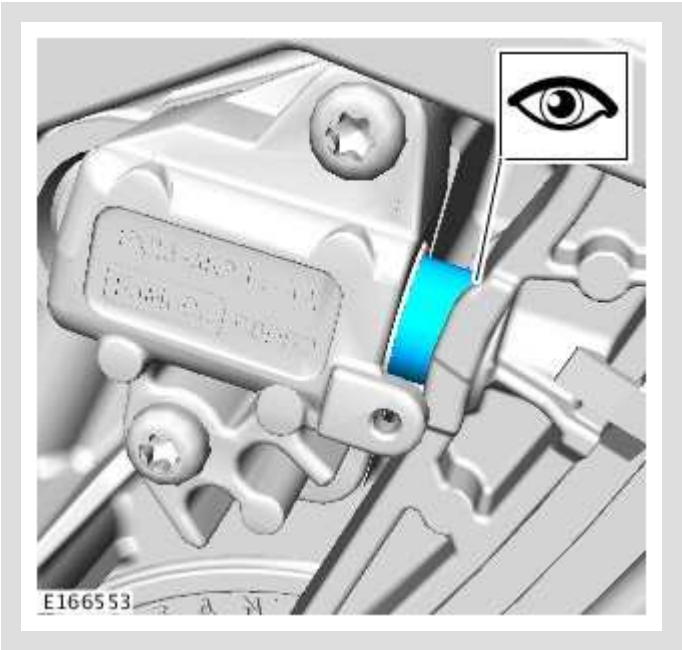
Remove the timing chain tensioner retaining pin and release the timing chain guide.

32.

NOTE:

Left hand illustration shown, Right hand is similar.

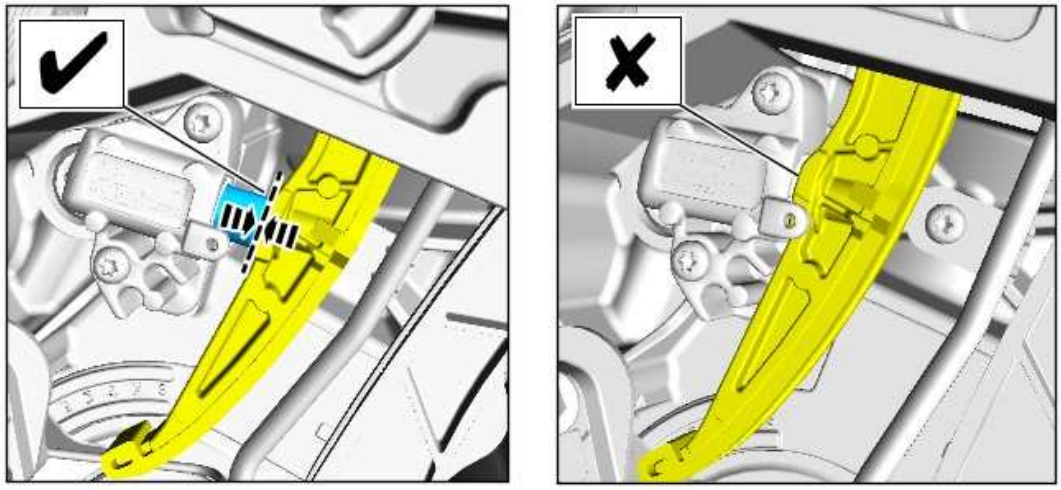
cardiagn.com



The piston should apply tension to the timing chain guide.

33.

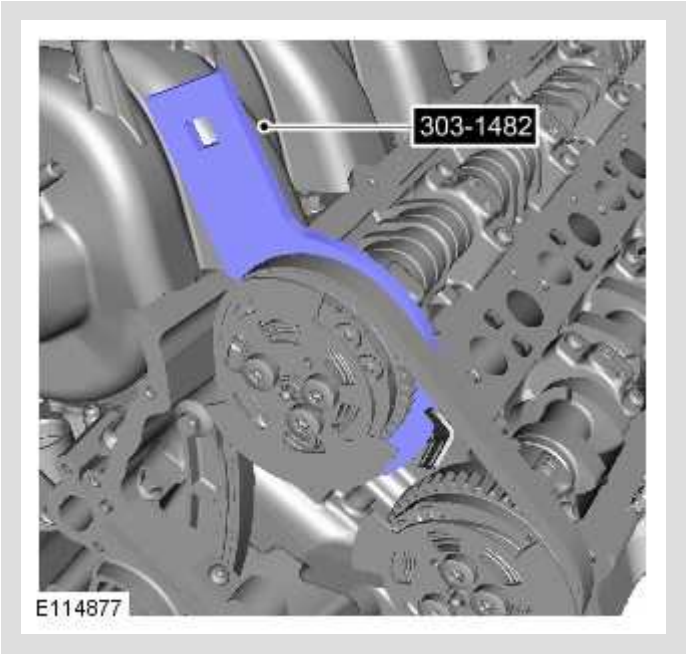
cardiagn.com



E166556

The timing chain tensioner must maintain tension on the chain guide. If the piston can be pushed back so the chain guide contacts with the body of the tensioner, the tensioner is not correct. Repeat steps 28-33.

cardiagn.com



Install the special tool.

Special Tool(s): 303-1482

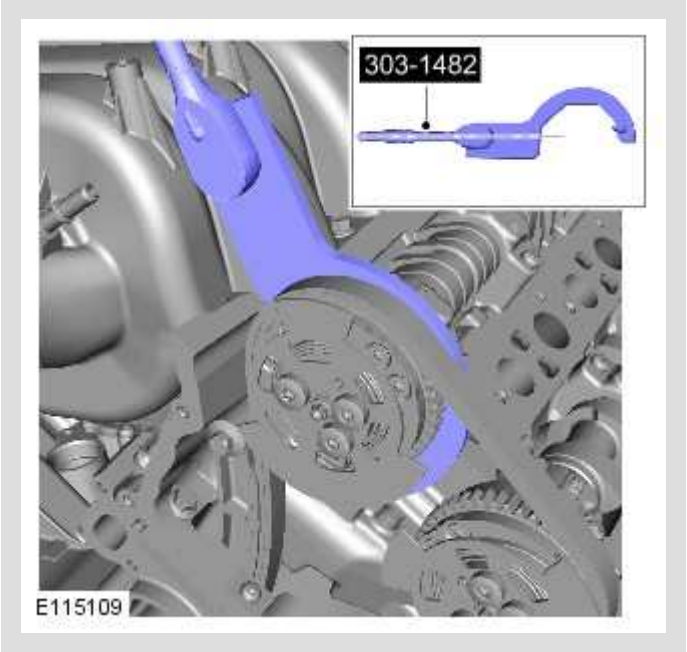
35.

CAUTIONS:

Apply the torque to the end of the special tool.

Make sure that the torque wrench is aligned with the special tool as illustrated in the graphic.

cardiagn.com



Install the torque wrench to the special tool.

Torque: **35 Nm**

36.

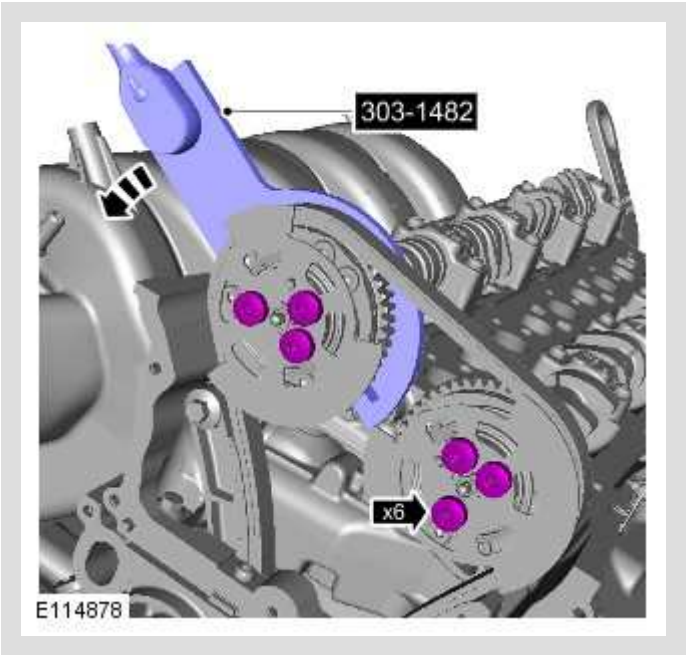
CAUTION:

Make sure that the torque wrench does not move whilst tightening the VVT bolts.

NOTE:

Make sure to tighten the exhaust VVT unit bolts first.

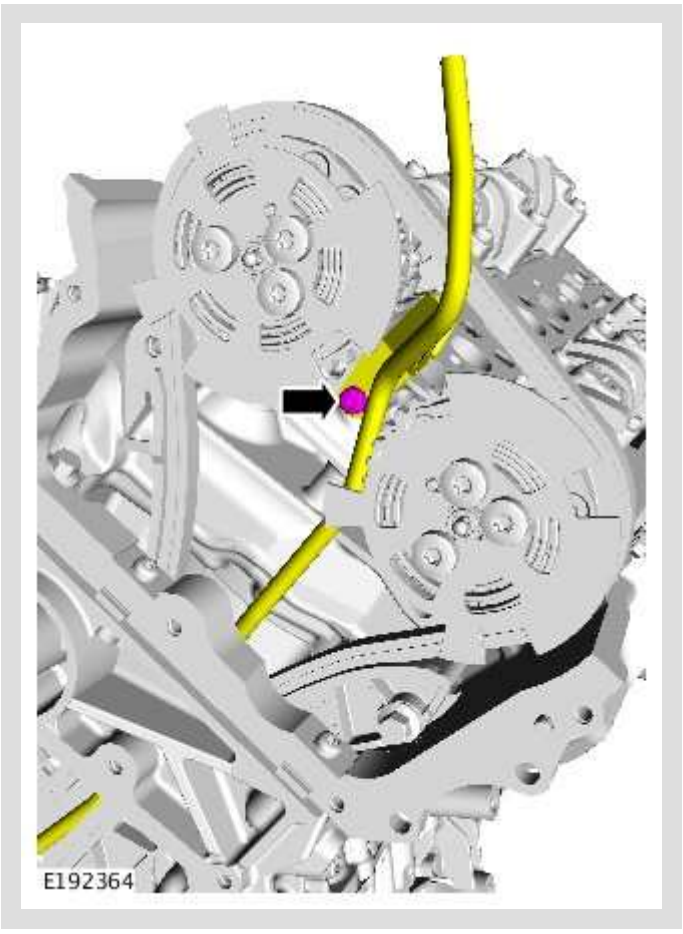
cardiagn.com



1. *Torque:* **32 Nm**

1. *Special Tool(s):* 303-1482

37.

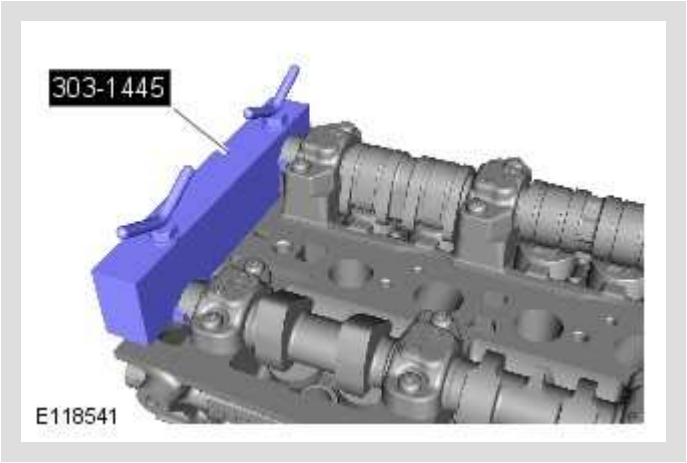


Install the oil drain tube.

cardiagn.com

Torque: **10 Nm**

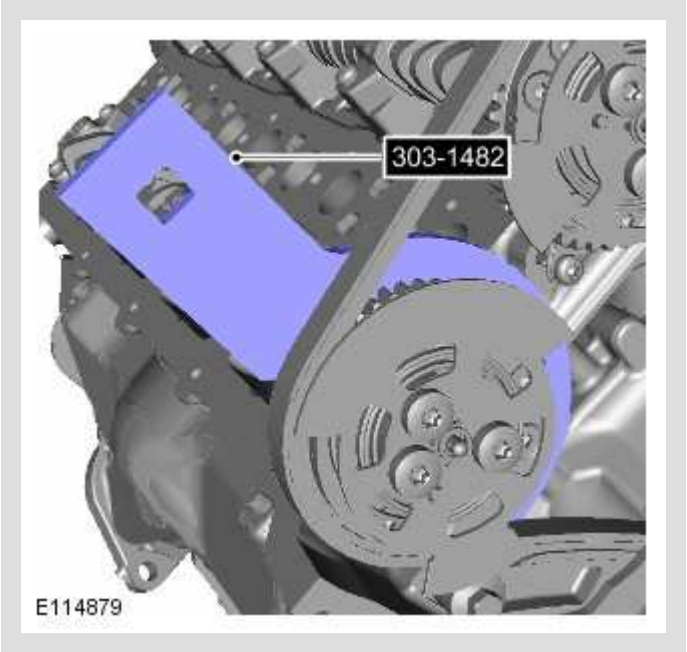
38.



Remove the special tool.

Special Tool(s): 303-1445

39.



Install the special tool.

Special Tool(s): 303-1482

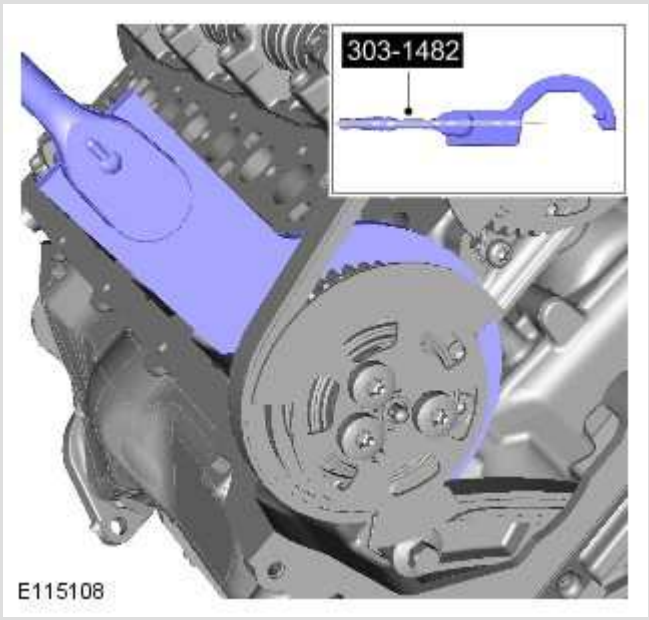
40.

cardiagn.com

CAUTIONS:

Apply the torque to the end of the special tool.

Make sure that the torque wrench is aligned with the special tool as illustrated in the graphic.



Install the torque wrench to the special tool.

Torque: **35 Nm**

41.

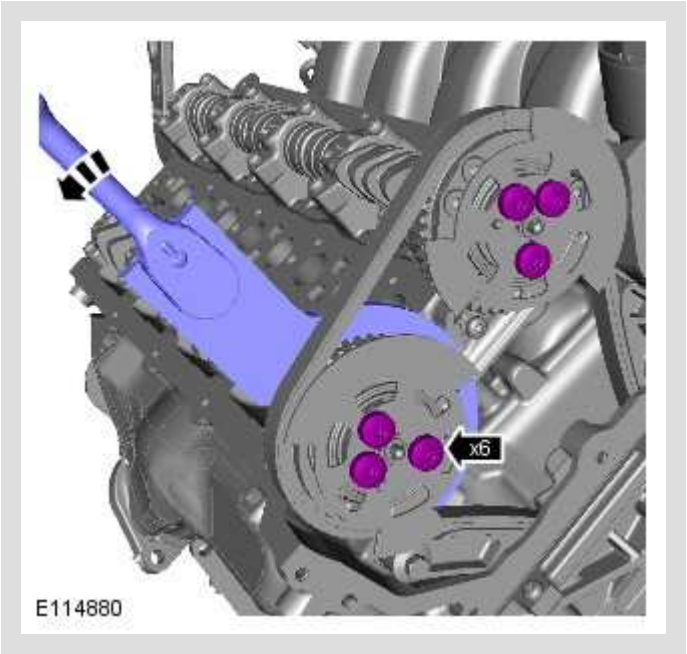
CAUTION:

Make sure that the torque wrench does not move whilst tightening the VVT bolts.

NOTE:

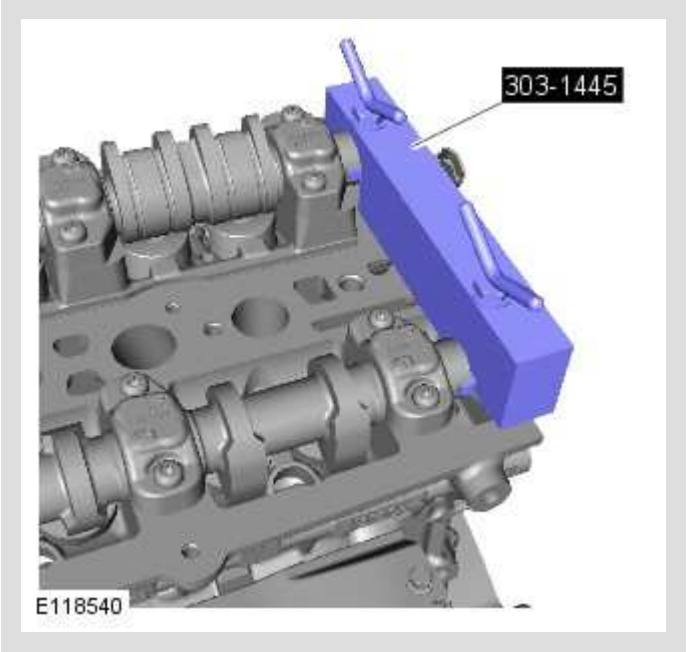
Make sure to tighten the inlet VVT unit bolts first.

cardiagn.com



Torque: **32 Nm**

42.

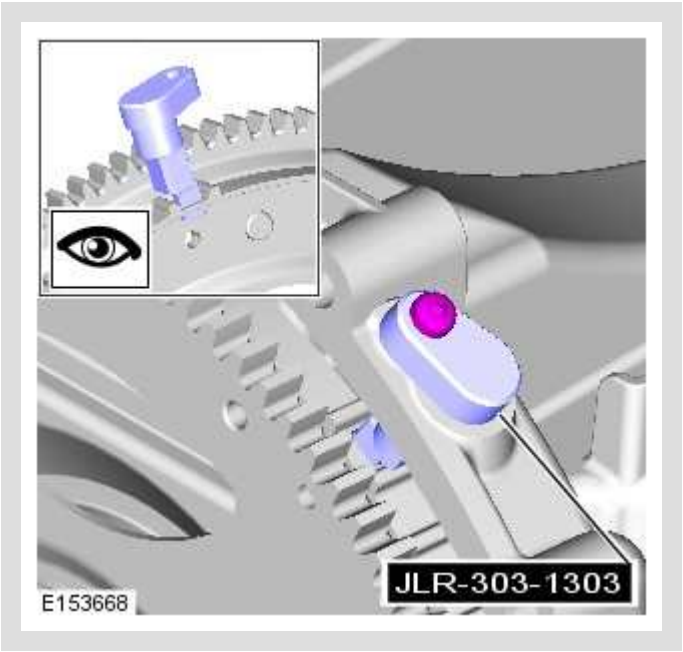


Remove the special tool.

Special Tool(s): 303-1445

43.

cardiagn.com



Remove the special tool.

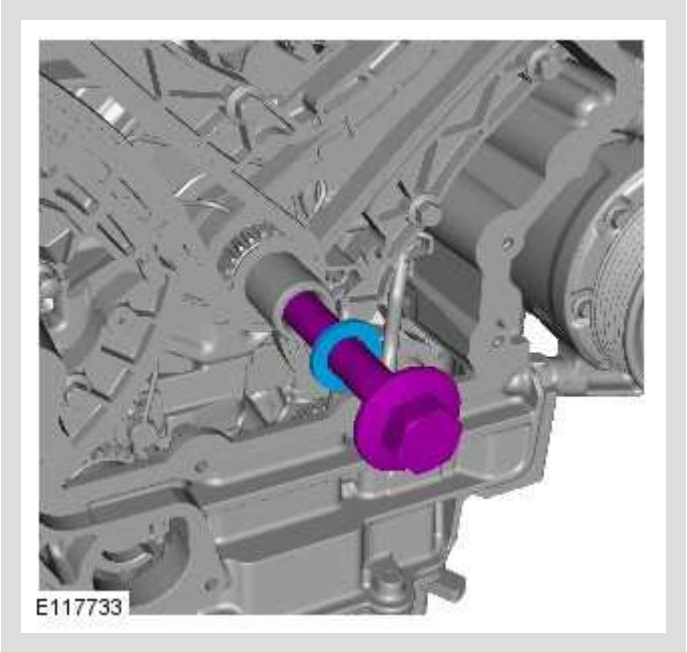
Special Tool(s): JLR-303-1303

44.

CAUTION:

An M16 washer must be used to prevent damage to the crankshaft on installation.

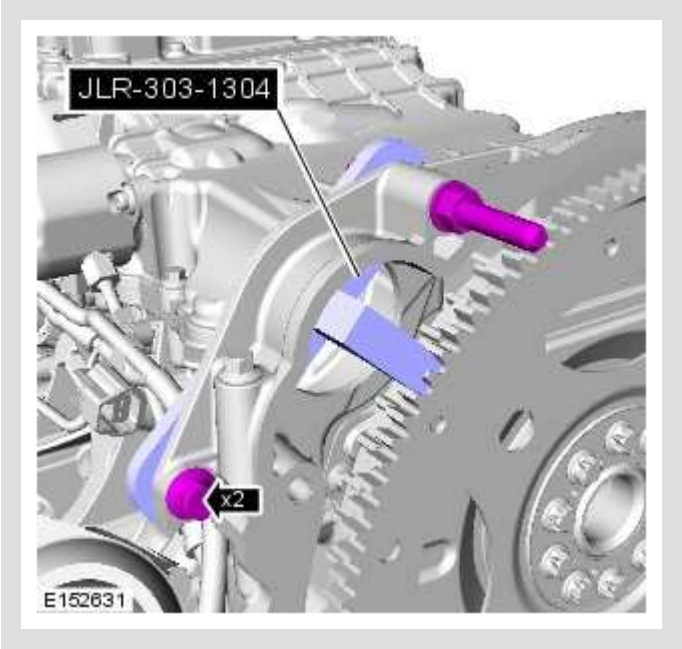
cardiagn.com



Install the crankshaft pulley bolt.

Torque: **20 Nm**

45.



Remove the special tool.

Special Tool(s): JLR-303-1304

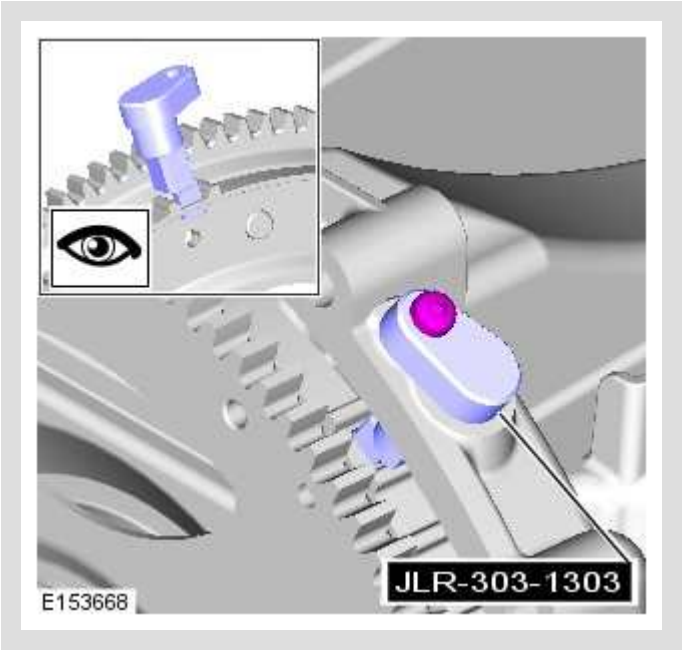
46. Rotate the engine two complete turns clockwise.

47.

CAUTION:

cardiagn.com

Only rotate the crankshaft clockwise.



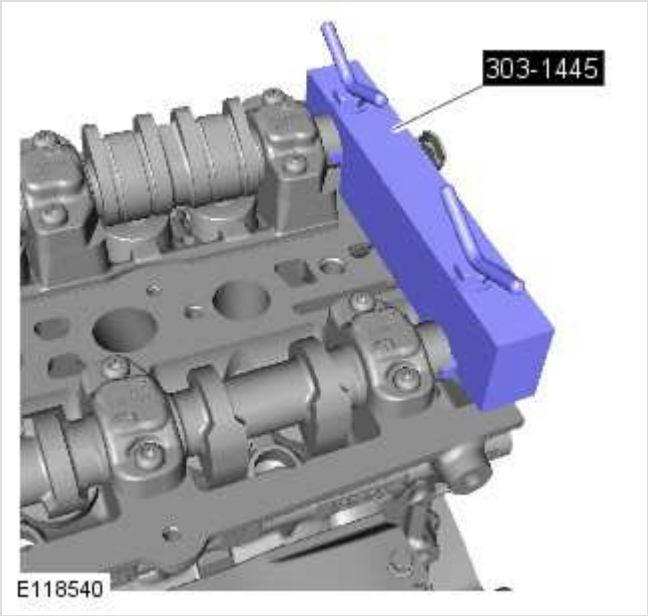
Install the special tool.
Special Tool(s): JLR-303-1303

48.

CAUTION:

If the special tool cannot be installed, the timing chain installation steps must be repeated.

cardiagn.com

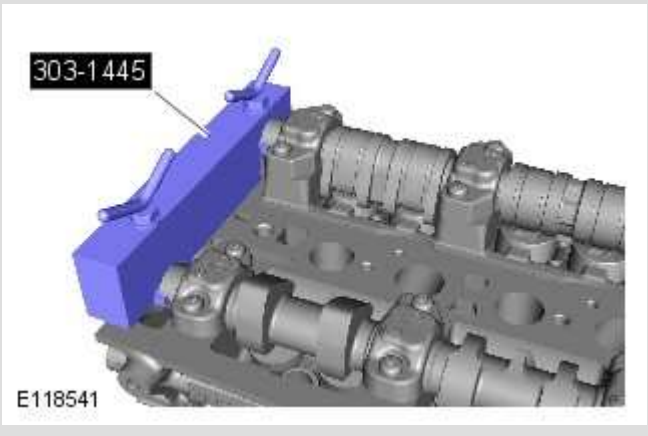


Install the special tool. If the special tool cannot be installed, remove both timing chains and components and repeat the process from step 3 of the installation until the special tool 303-1445 is installed correctly.
Special Tool(s): 303-1445

49.

CAUTION:

If the special tool cannot be installed, the timing chain installation steps must be repeated.

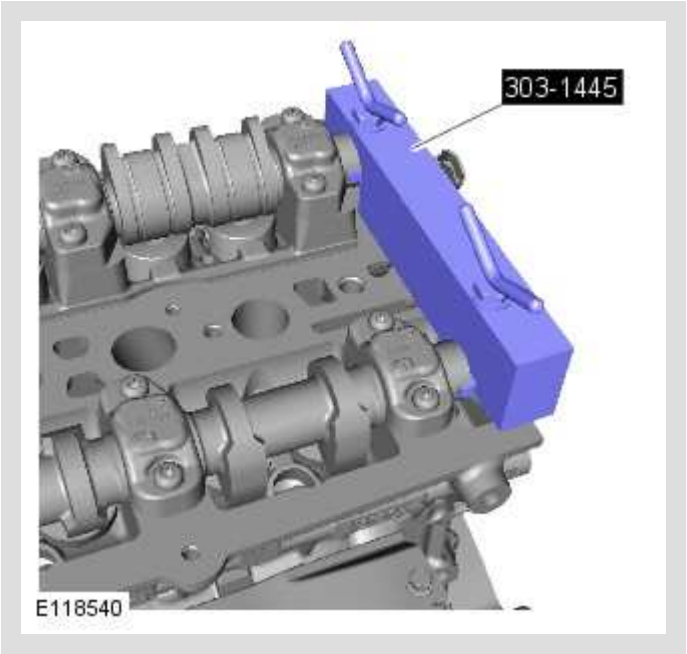


Install the special tool. If the special tool cannot be installed,

cardiagn.com

remove both timing chains and components and repeat the process from step 3 of the installation until the special tool 303-1445 is installed correctly.

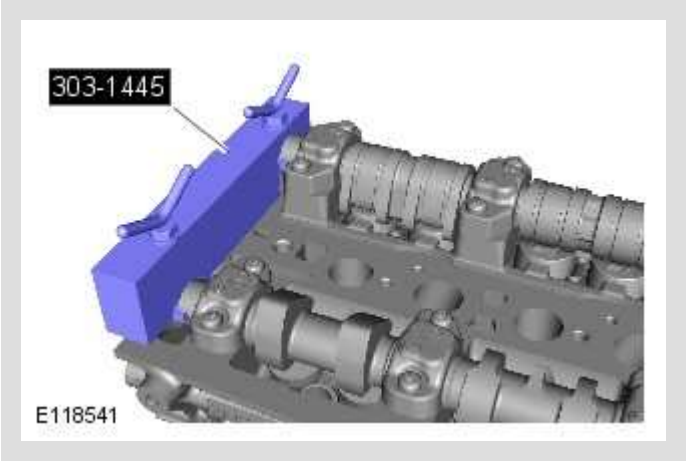
50.



Remove the special tool.

Special Tool(s): 303-1445

51.

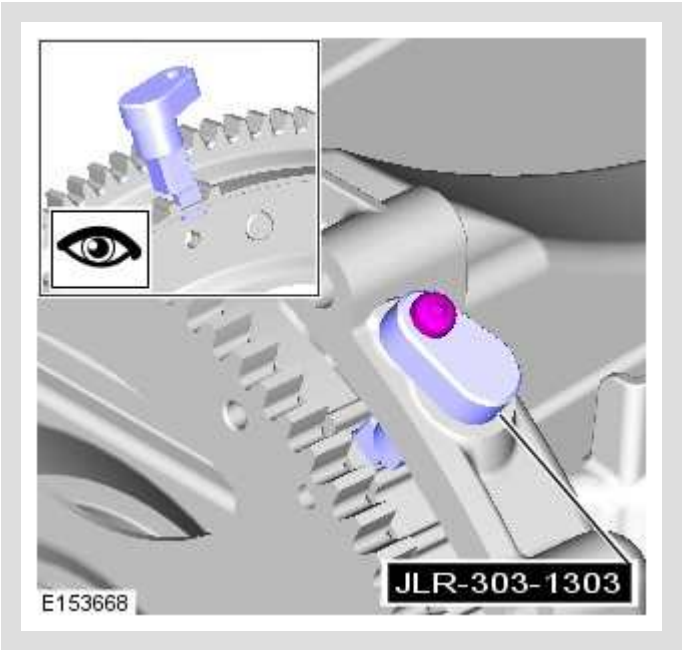


Remove the special tool.

Special Tool(s): 303-1445

52.

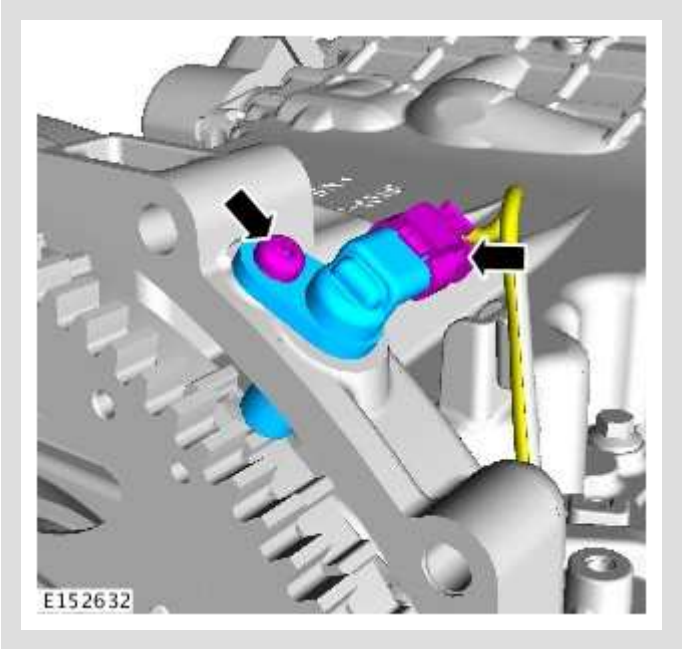
cardiagn.com



Remove the special tool.

Special Tool(s): JLR-303-1303

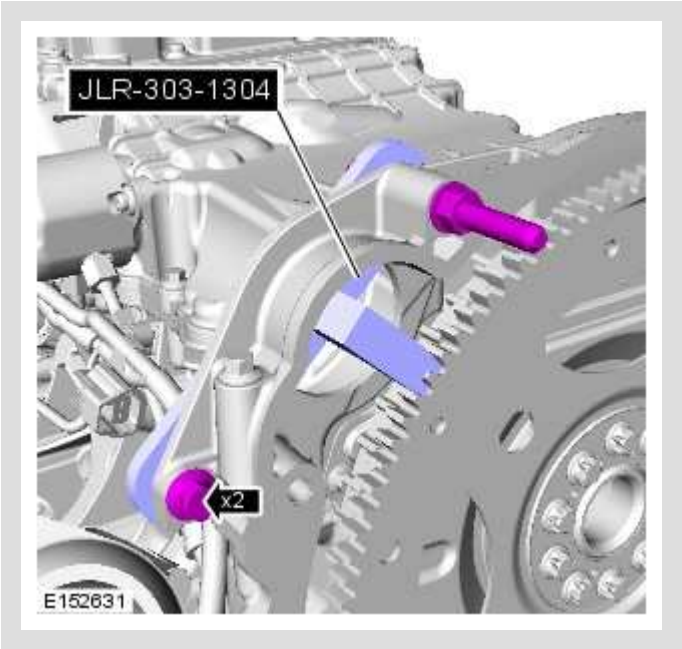
53.



Torque: **10 Nm**

54.

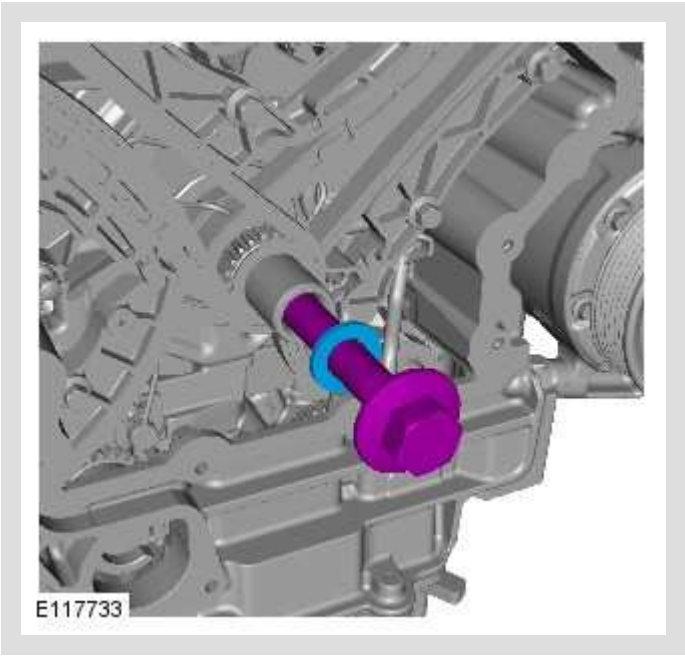
cardiagn.com



Install the special tool.

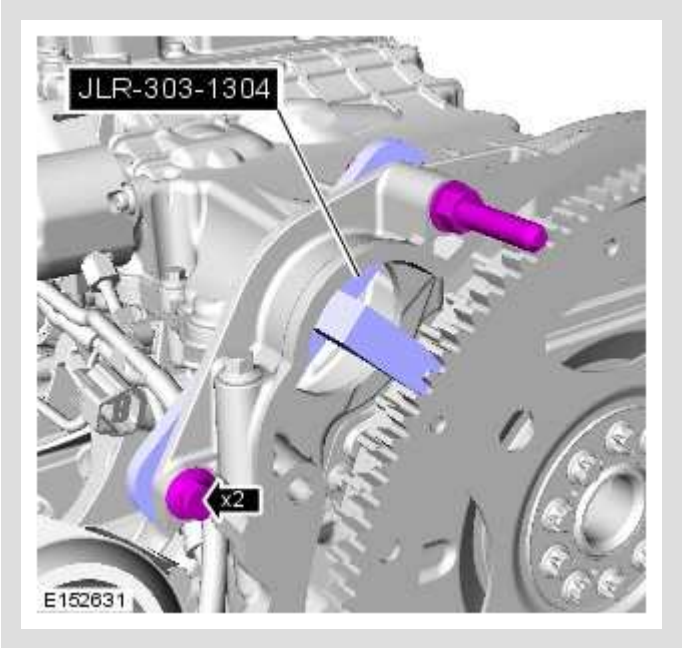
Special Tool(s): JLR-303-1304

55.



56.

cardiagn.com



Remove the special tool.
Special Tool(s): JLR-303-1304

57. Install the timing cover.
Refer to: Timing Cover (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

58. Install the starter motor
Refer to: Starter Motor (303-06A, Removal and Installation).
Refer to: Starter Motor (303-06B, Removal and Installation).

59. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

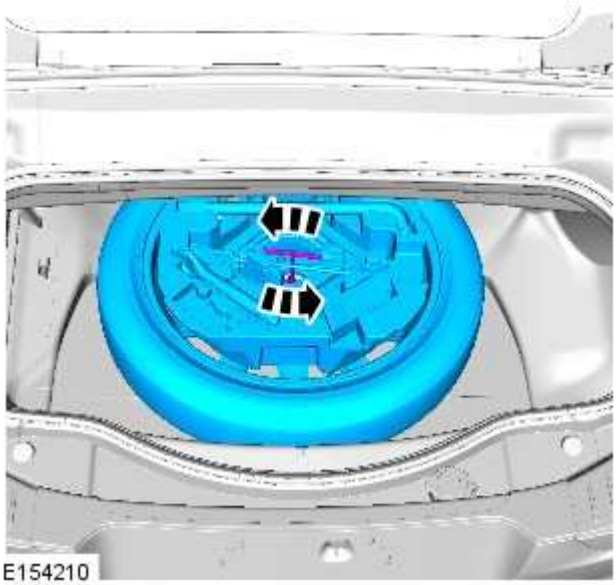
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

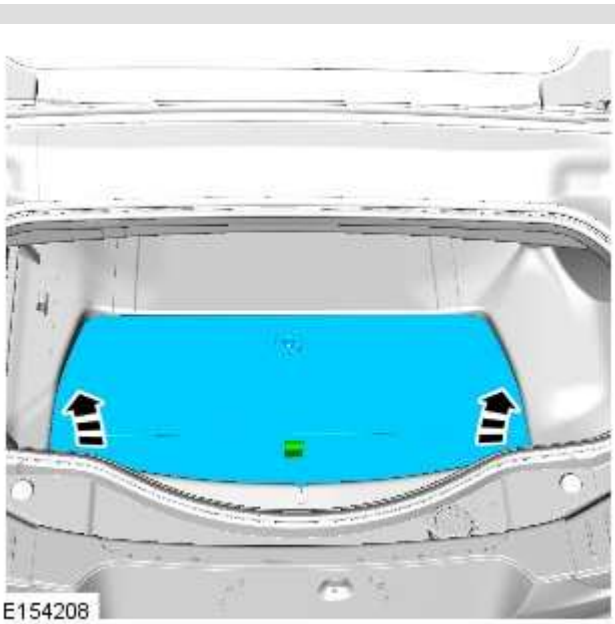
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

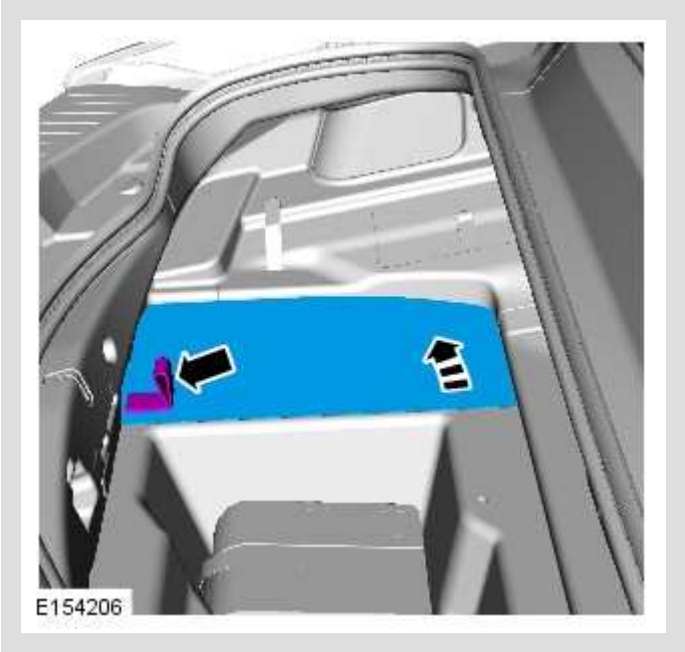

E154210

4.


E154208

5.

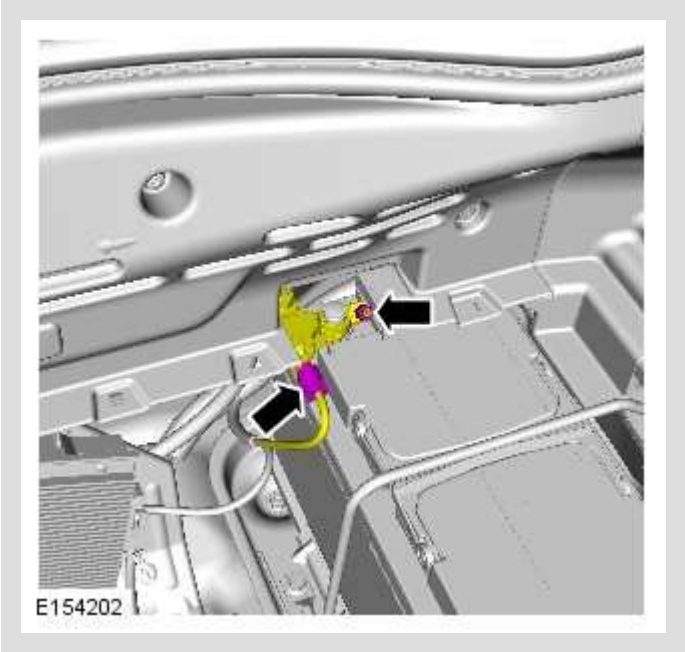
cardiagn.com



6.

CAUTION:

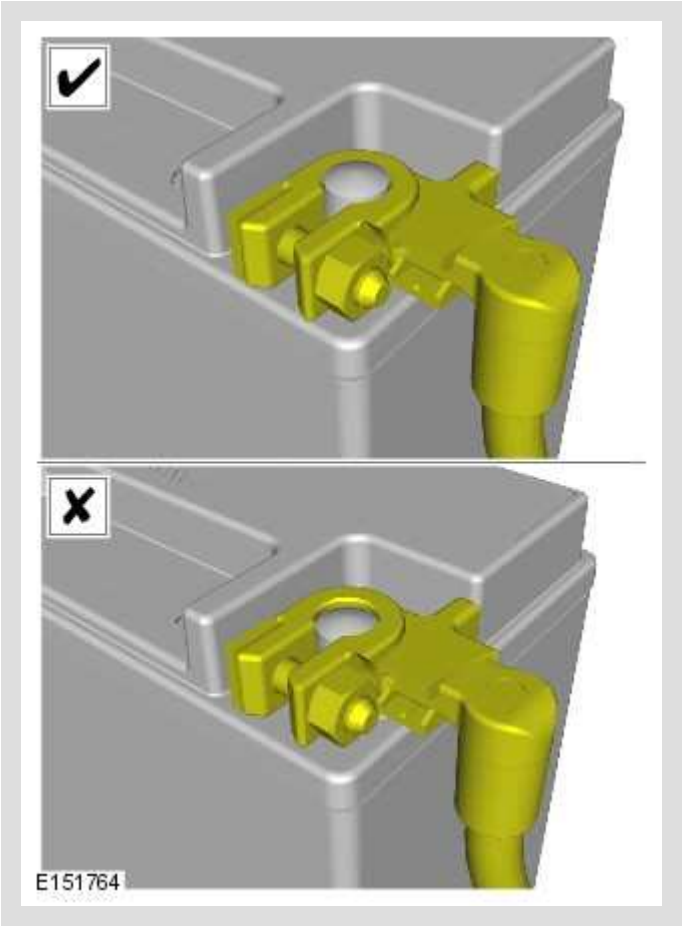
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

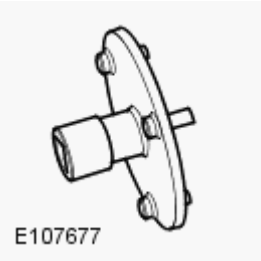
ENGINE - V6 S/C 3.0L PETROL

CRANKSHAFT FRONT SEAL (G1584102)

REMOVAL AND INSTALLATION

12.21.14	CRANKSHAFT FRONT OIL SEAL - RENEW	ALL DERIVATIVES	3.8	USED WITHINS

SPECIAL TOOL(S)



303-1434

Remover/Installer, Front Crankshaft Seal

REMOVAL

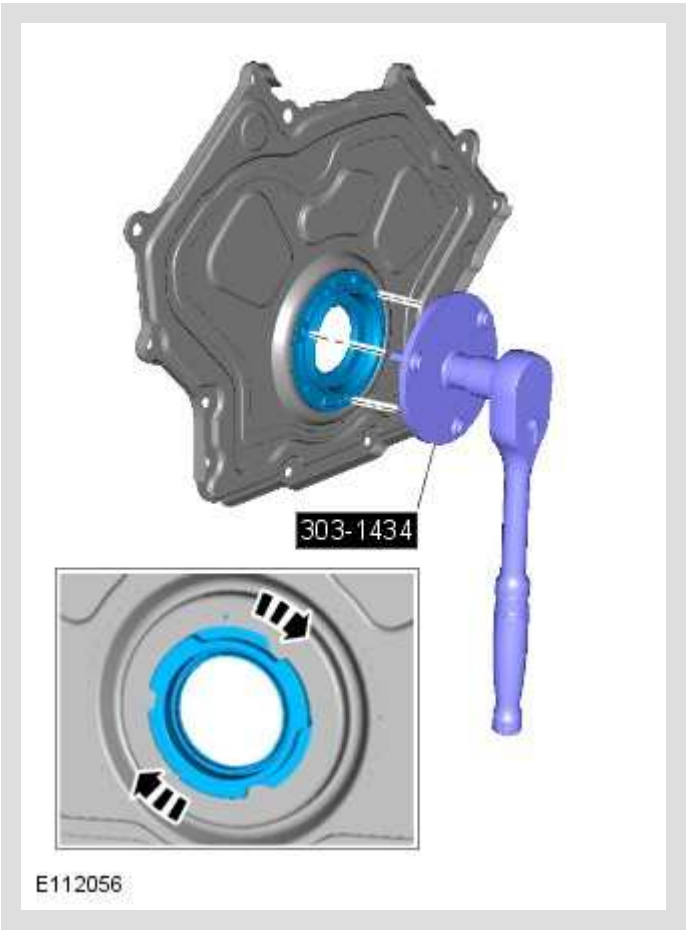
cardiagn.com

NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Crankshaft Pulley (303-01, Removal and Installation).

3. 

Special Tool(s): 303-1434

Torque: **26 Nm**

cardiagn.com

INSTALLATION

1.

CAUTIONS:

- Do not over tighten the crankshaft front seal. Failure to follow this instruction may result in damage to the vehicle.
- Take extra care not to damage the seal.

To install, reverse the removal procedure.

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS	

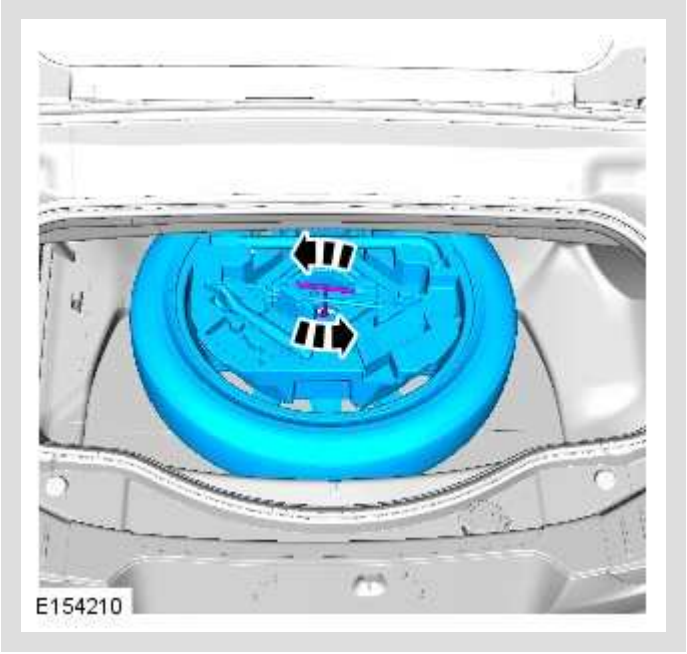
cardiagn.com

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

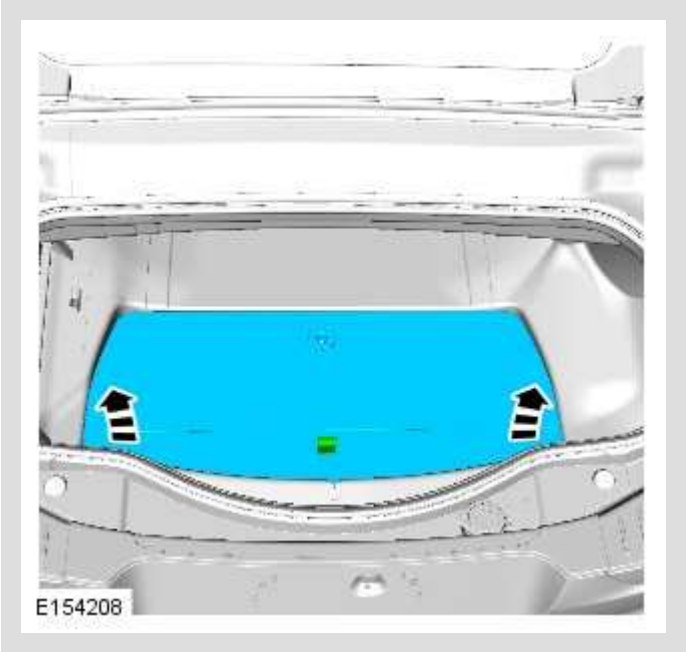
1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

2. Obtain and record the audio unit preset radio frequencies.

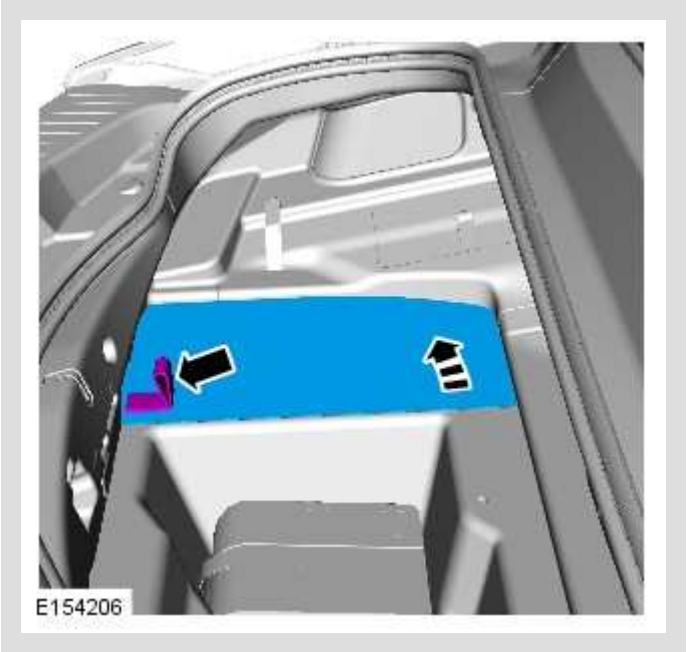
3. 

4.

cardiagn.com



5.

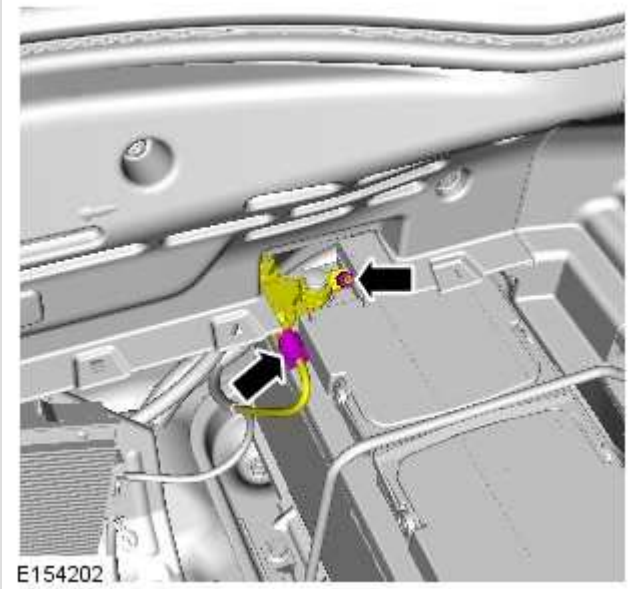


6.

cardiagn.com

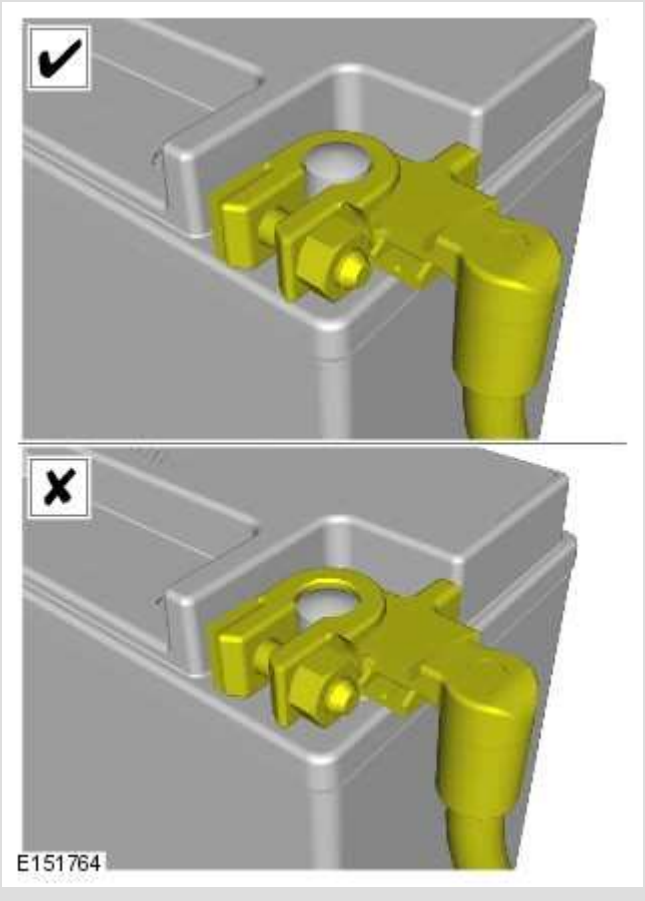
CAUTION:

Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.



cardiagn.com

8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

CRANKSHAFT PULLEY (G1851000)

REMOVAL AND INSTALLATION

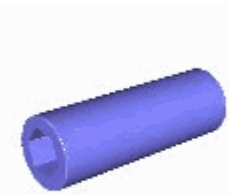
12.21.09	CRANKSHAFT DAMPER - RENEW	ALL DERIVATIVES	3.8	USED WITHINS

SPECIAL TOOL(S)

E115256

303-1437

Crankshaft Damper Remover/Installer



E115257

303-1438

Crankshaft Damper Bolt Remover/Installer

cardiagn.com

E115258

303-1439

Crankshaft Damper Removal Plate

E115259

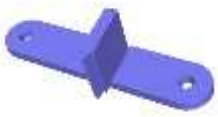
303-1440

Crankshaft Damper Removal/Installation Stud

E115260

303-1441

Crankshaft Damper Remover/Installer Body



E115266

303-1448

Locking Tool

cardiagn.com

E152576	**JLR-303-1304** Locking Tool

REMOVAL

NOTES:

- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Disconnect the battery ground cable.
   Refer to: Specifications (414-01 Battery, Mounting and Cables, Specifications).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

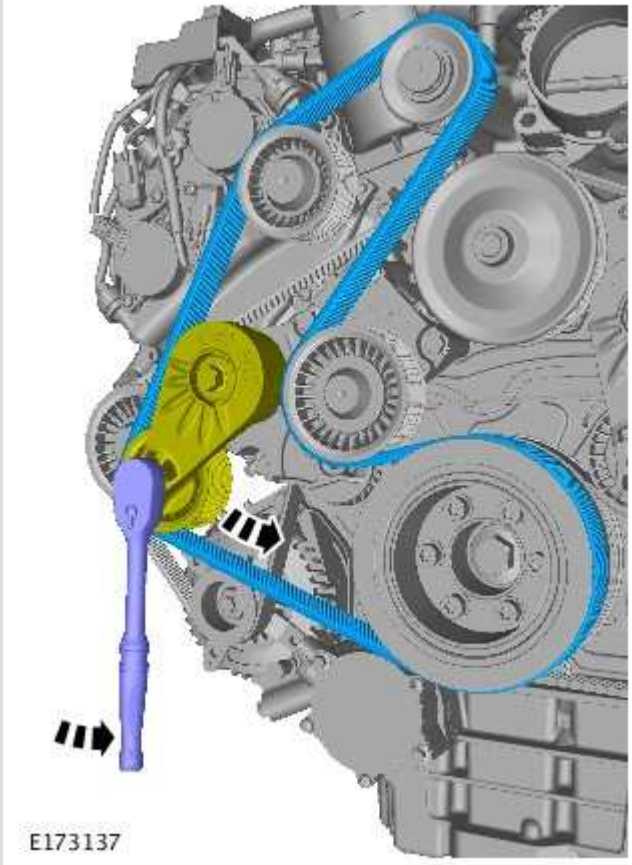
   Raise and support the vehicle.

3. Remove the cooling fan.
   Refer to: Cooling Fan (303-03C, Removal and Installation).

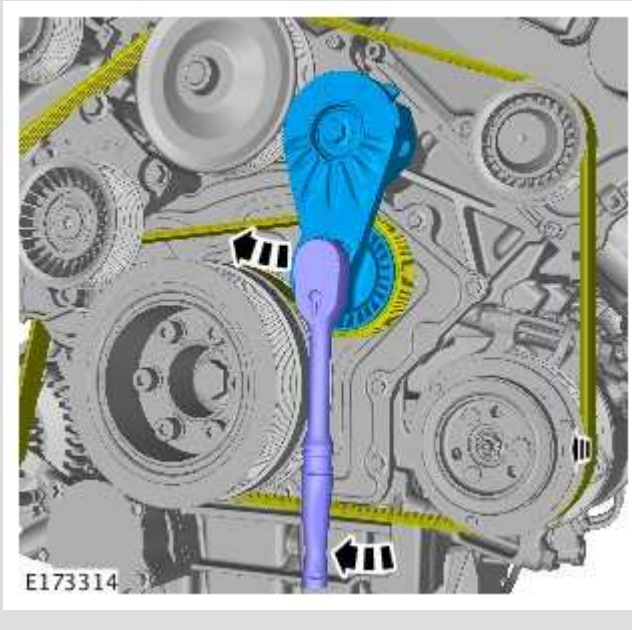
cardiagn.com

4. Remove the starter motor.
   Refer to: Starter Motor (303-06C, Removal and Installation).

5.

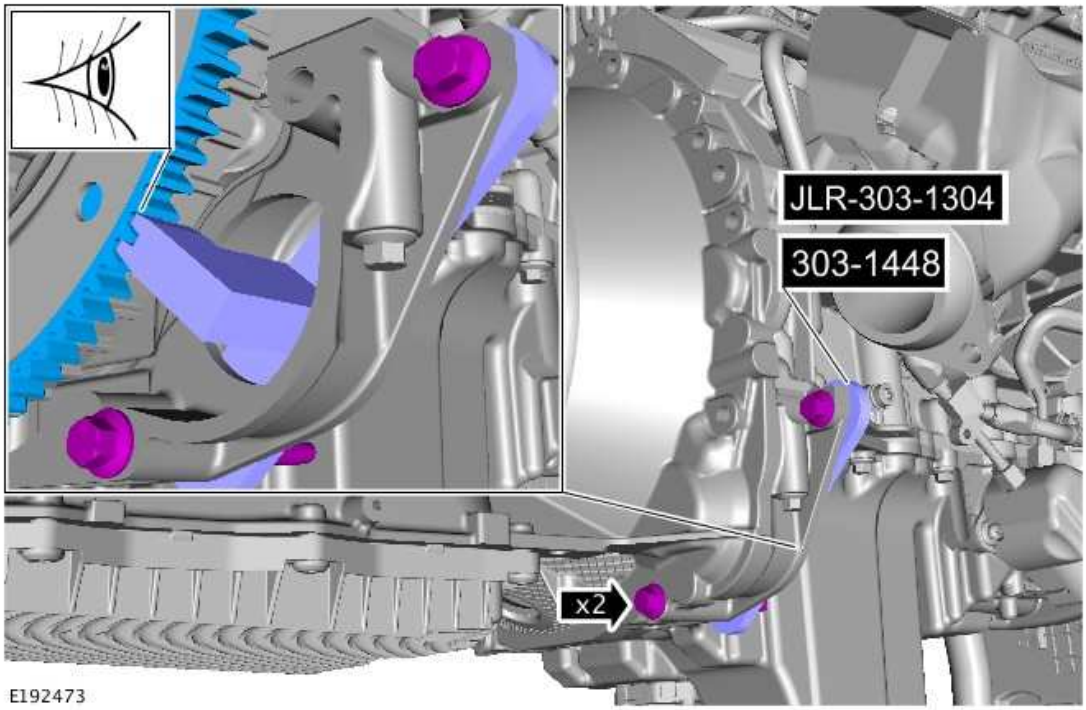


6.



7.

cardiagn.com



Install the special tool.

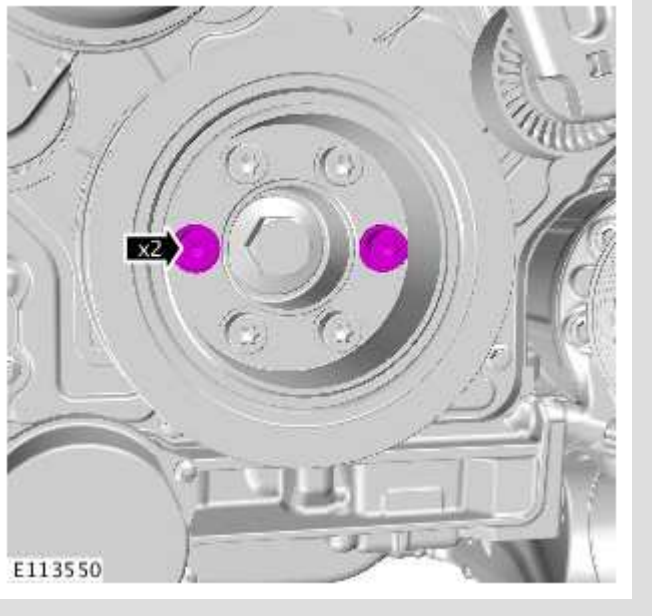
Vehicles without Auto stop/start system.

Special Tool(s): 303-1448

Vehicles with Auto stop/start system.

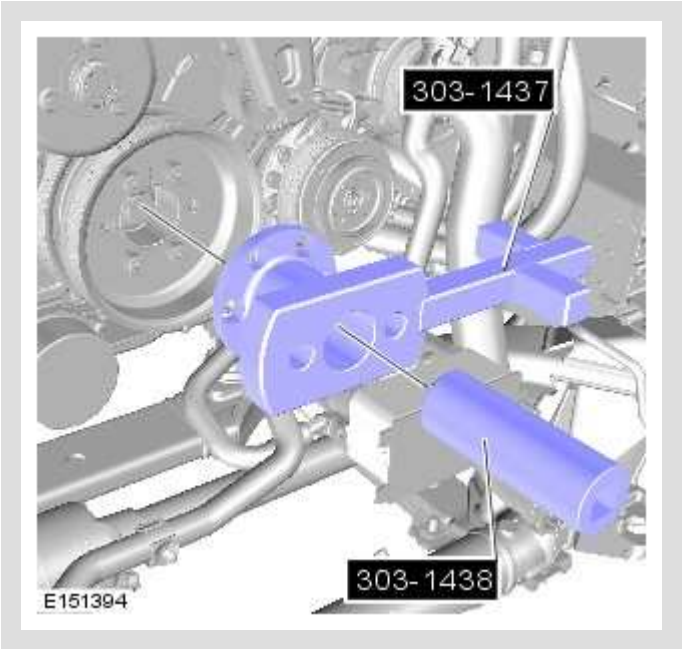
Special Tool(s): JLR-303-1304

8.



9.

cardiagn.com

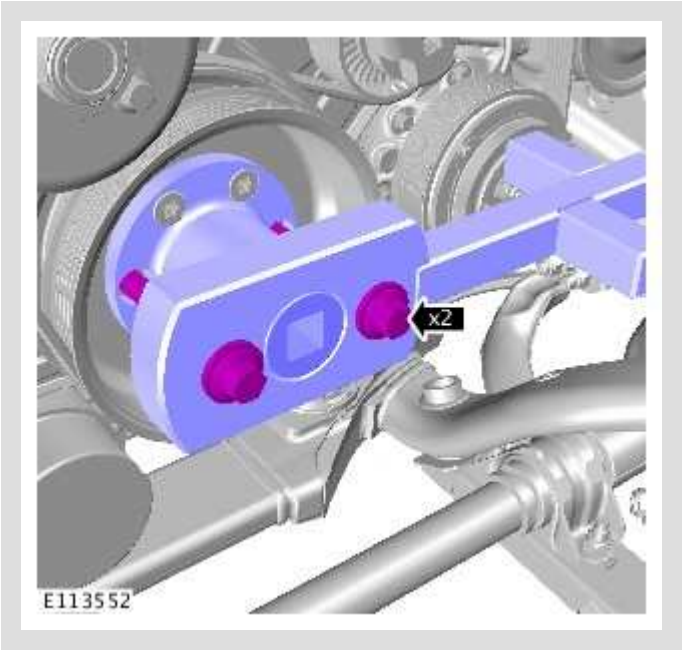


Install the special tools.

Special Tool(s): 303-1437

Special Tool(s): 303-1438

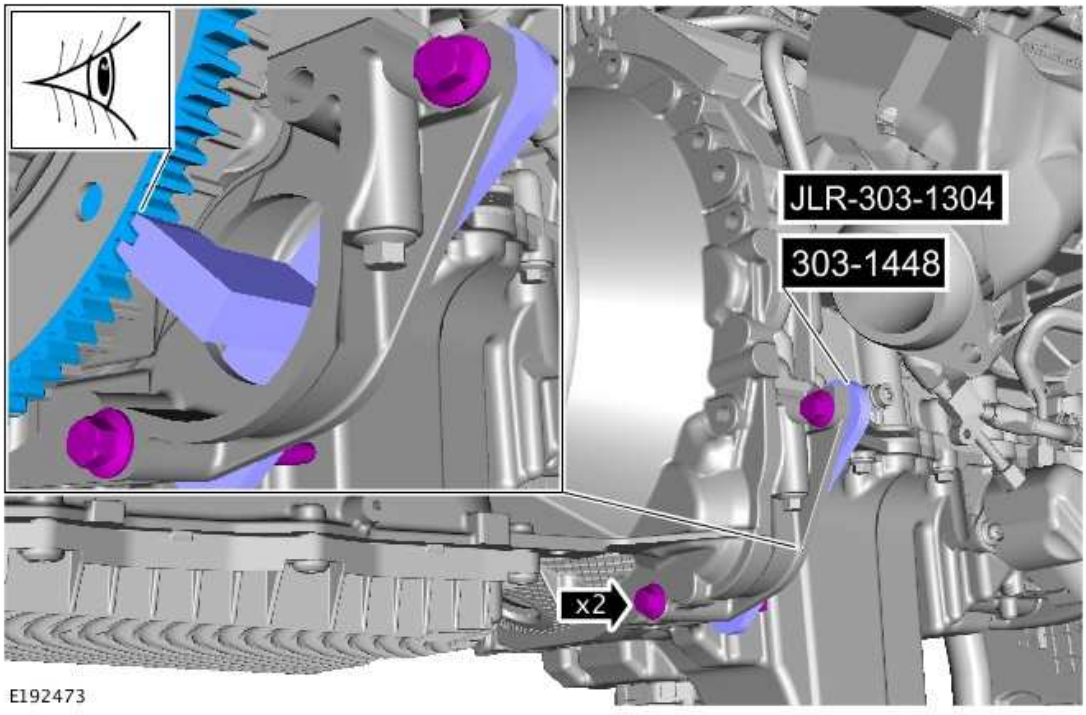
10.



Torque: **25 Nm**

11.

cardiagn.com



Remove the special tool.

Vehicles without Auto stop/start system.

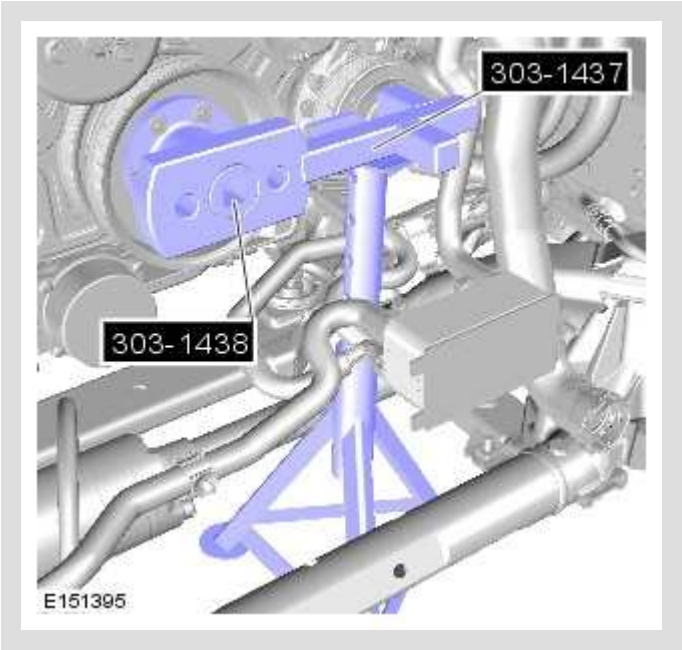
Special Tool(s): 303-1448

Vehicles with Auto stop/start system.

Special Tool(s): JLR-303-1304

12.

cardiagn.com



Using a suitable vehicle stand, support the special tools.

Special Tool(s): 303-1437

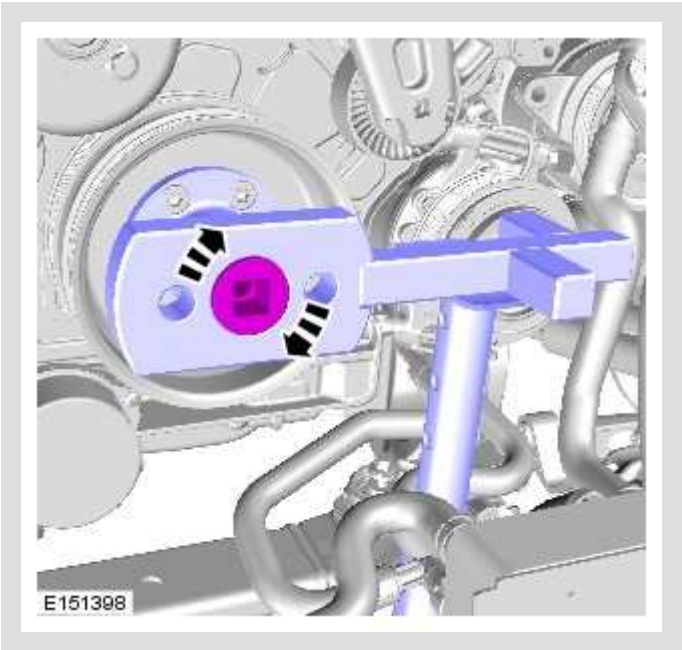
Special Tool(s): 303-1438

13.

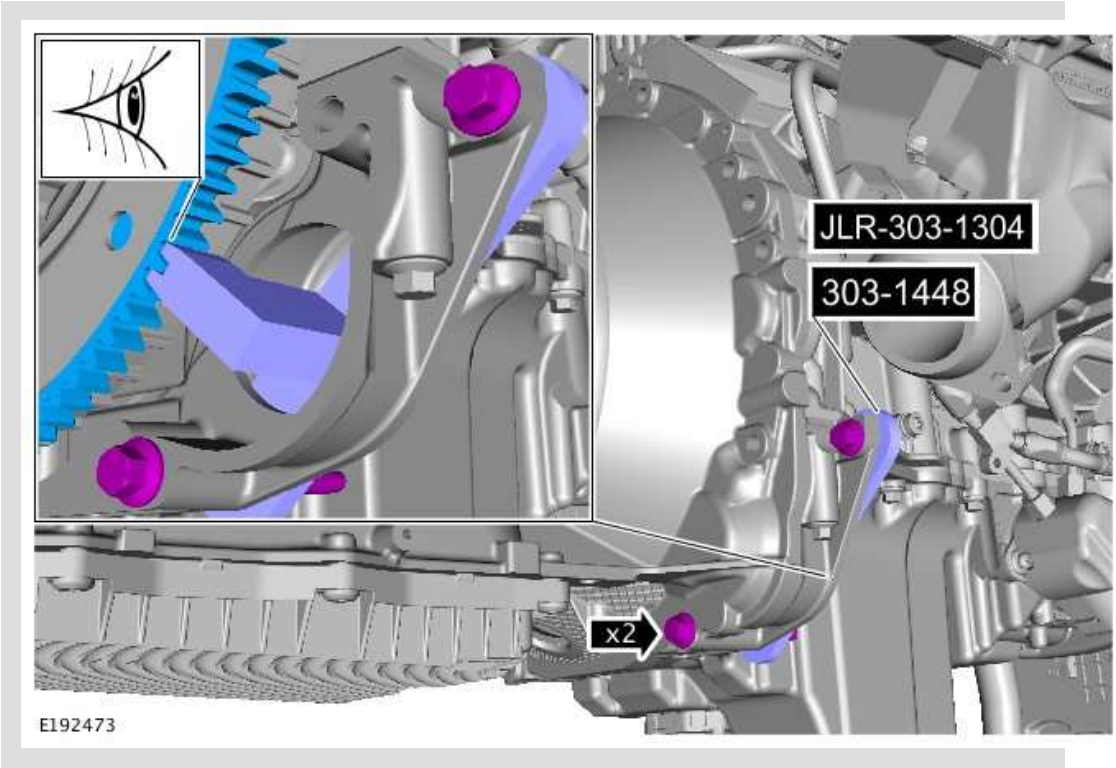
NOTE:

The crankshaft pulley bolt will be very tight.

cardiagn.com



14.



Install the special tool.

Vehicles without Auto stop/start system.

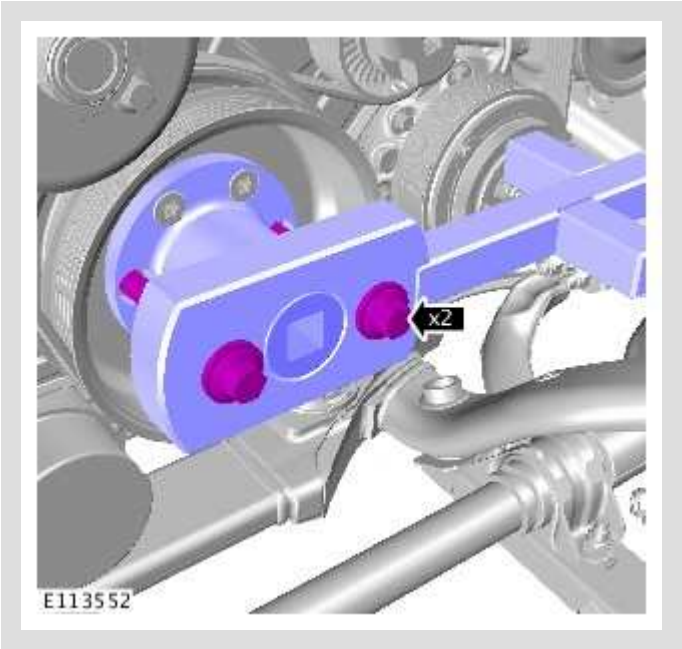
Special Tool(s): 303-1448

cardiagn.com

Vehicles with Auto stop/start system.

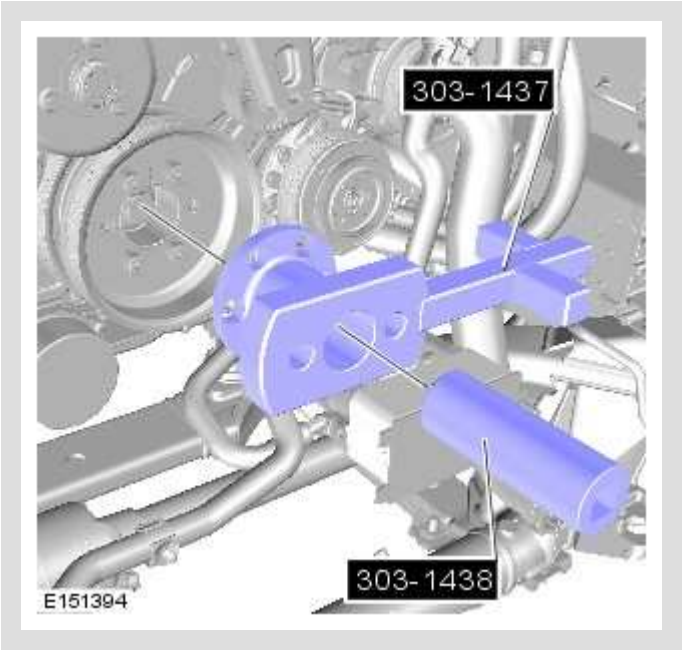
Special Tool(s): JLR-303-1304

15.



Remove the two bolts.

16.



Remove the special tools.

Special Tool(s): 303-1437

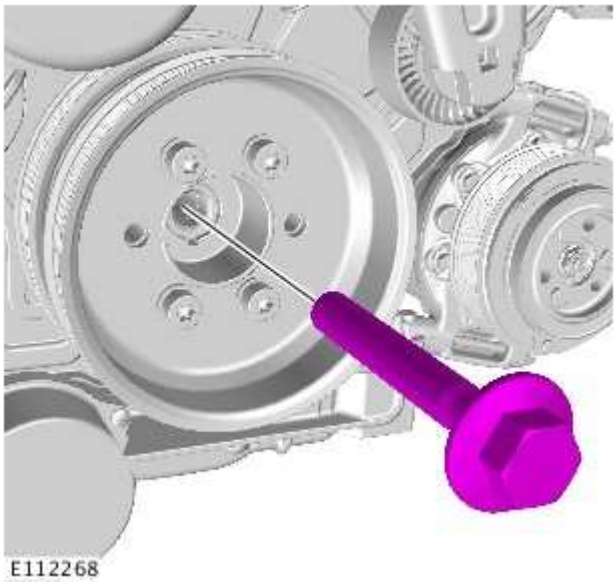
Special Tool(s): 303-1438

cardiagn.com

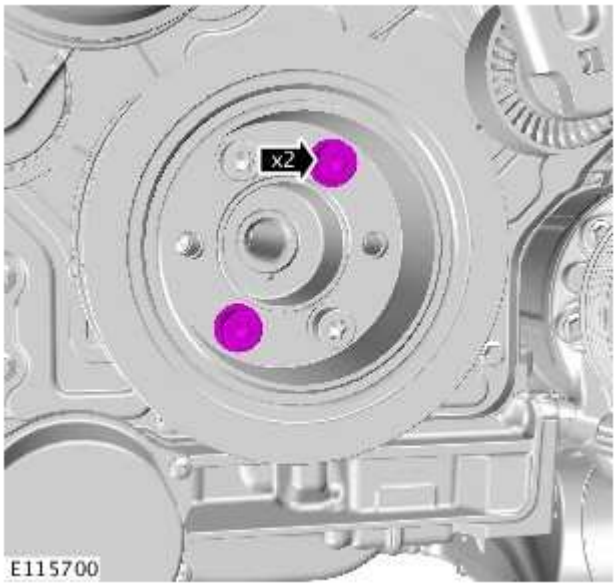
17.

CAUTION:

Discard the bolt.

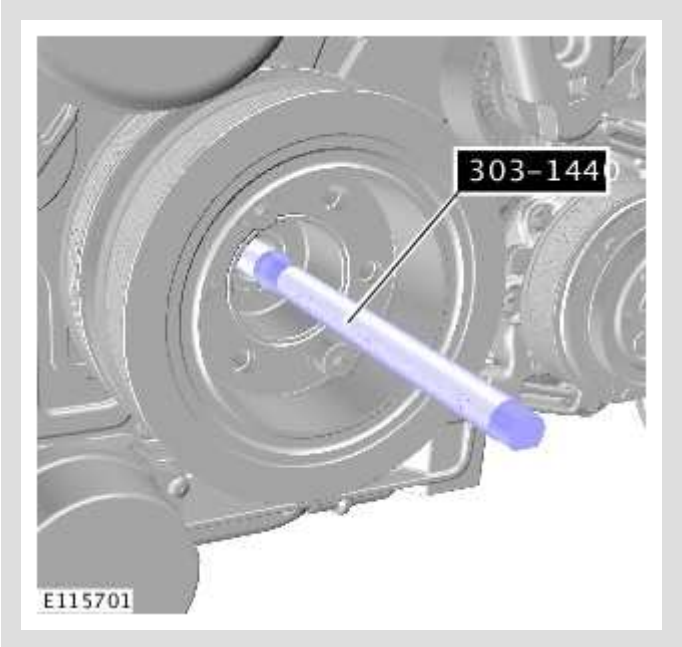


18.



19.

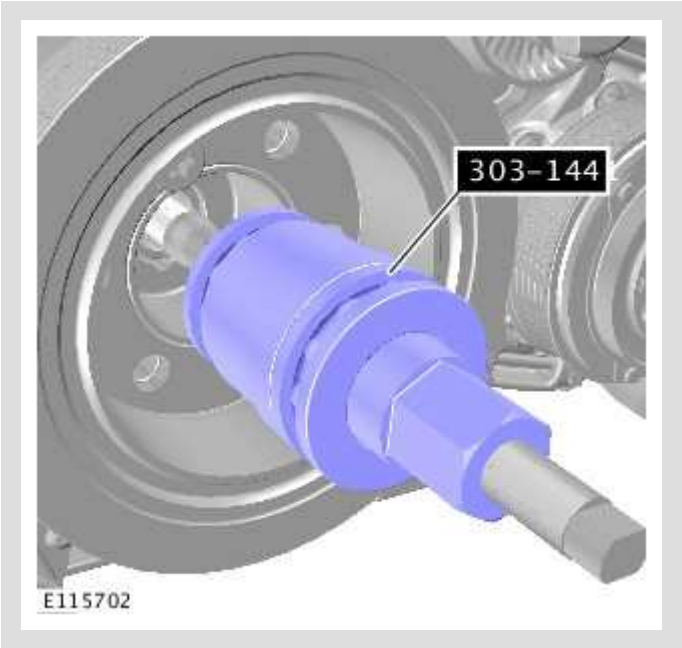
cardiagn.com



Install the special tool.

Special Tool(s): 303-1440

20.

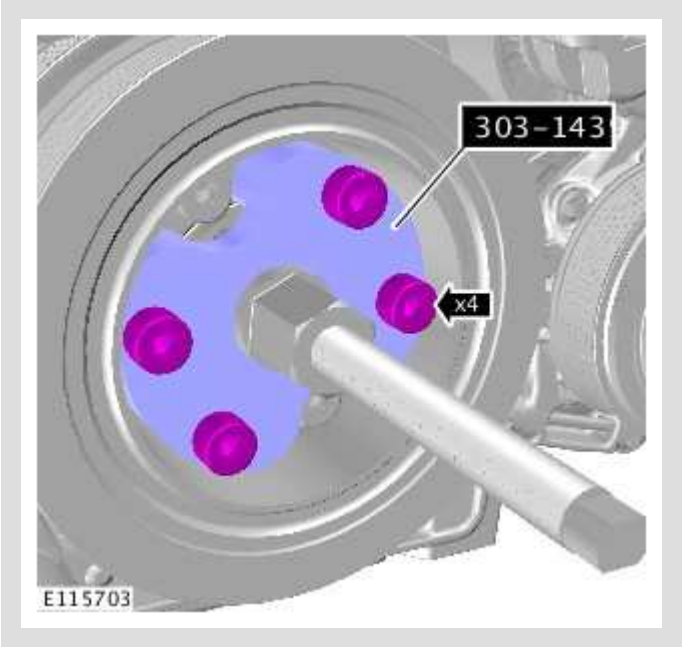


Install the special tool.

Special Tool(s): 303-1441

cardiagn.com

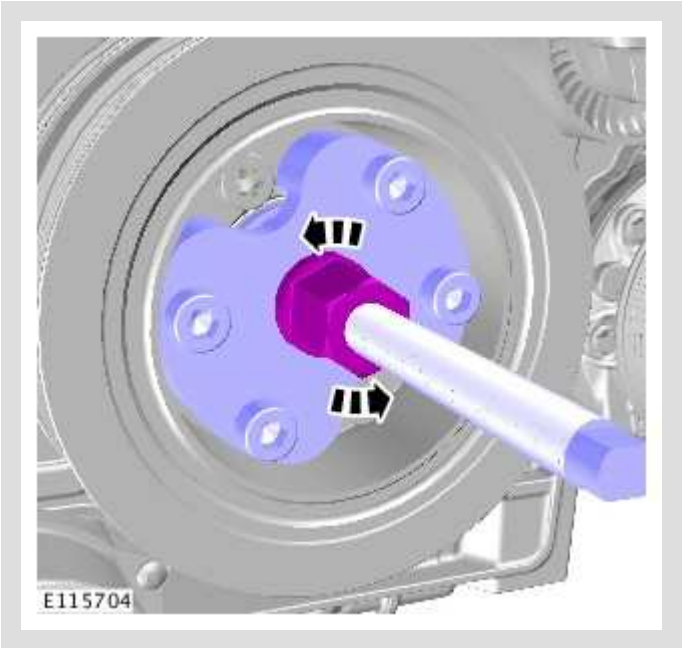
21.



Install the special tool.

Special Tool(s): 303-1439

22.



23.

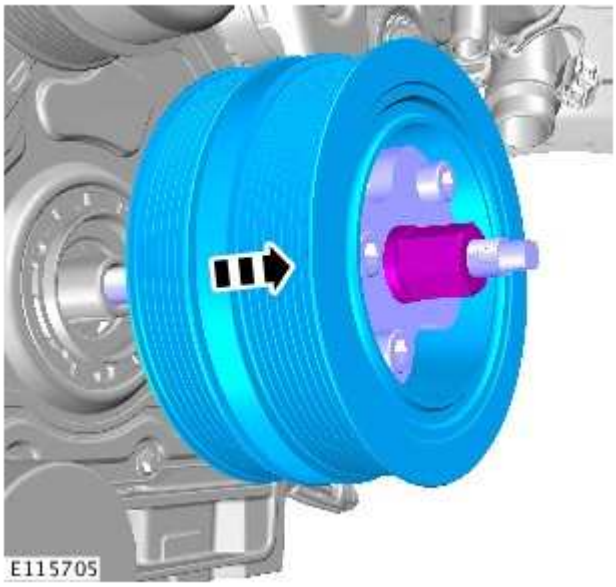
CAUTION:

Discard the friction washer after removing the crankshaft pulley.

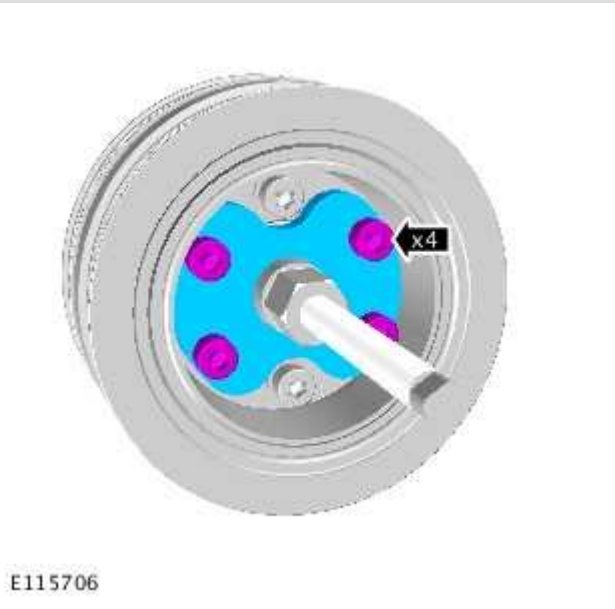
cardiagn.com

NOTE:

Make sure to clean the threads in the end of the crankshaft and that the crank nose is free of any foreign materials.



24.

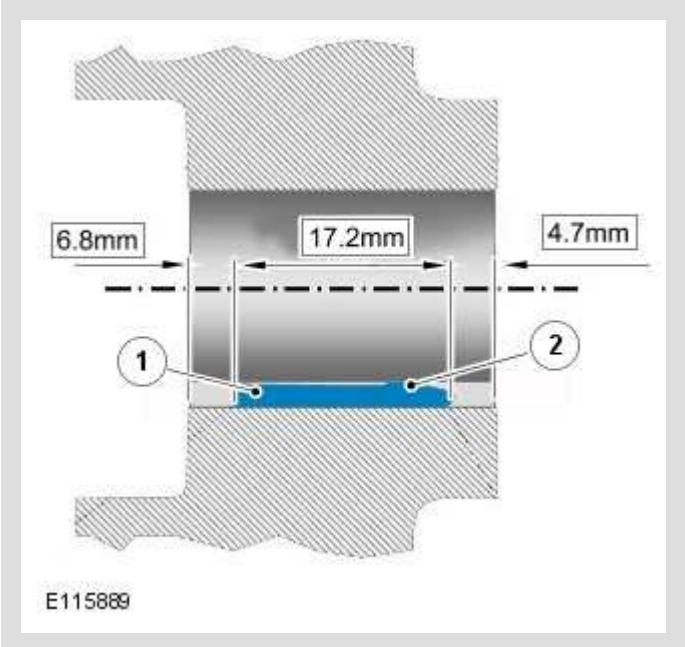


25.

cardiagn.com

INSTALLATION

1.



1. Apply RTV sealant to the crankshaft pulley keyway.

cardiagn.com

1. Make sure that the RTV sealant is applied in a 2mm diameter bead.
1. Make sure that when the RTV sealant is applied that the RTV sealant is level with the top of the keyway.

2.

CAUTION:

Install a new friction washer before installing the crankshaft pulley.

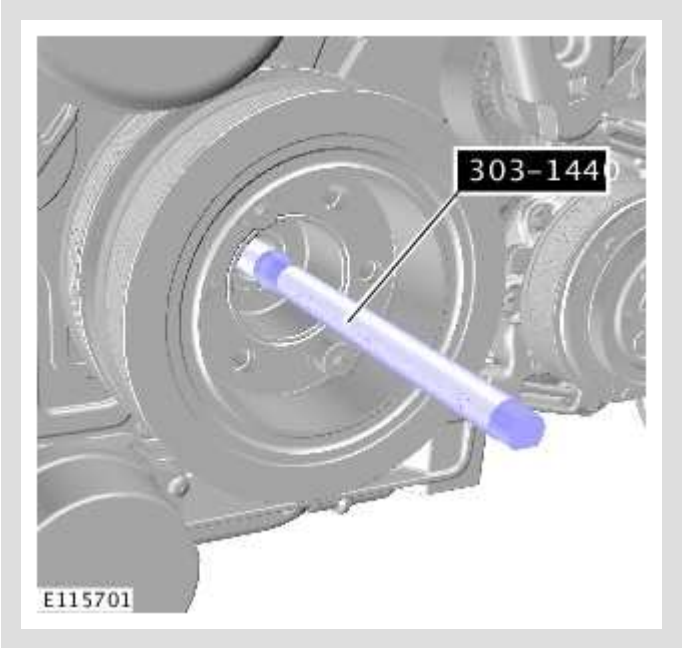
NOTE:

Make sure to clean the threads in the end of the crankshaft and that the crank nose is free of any foreign materials.

E112288

3.

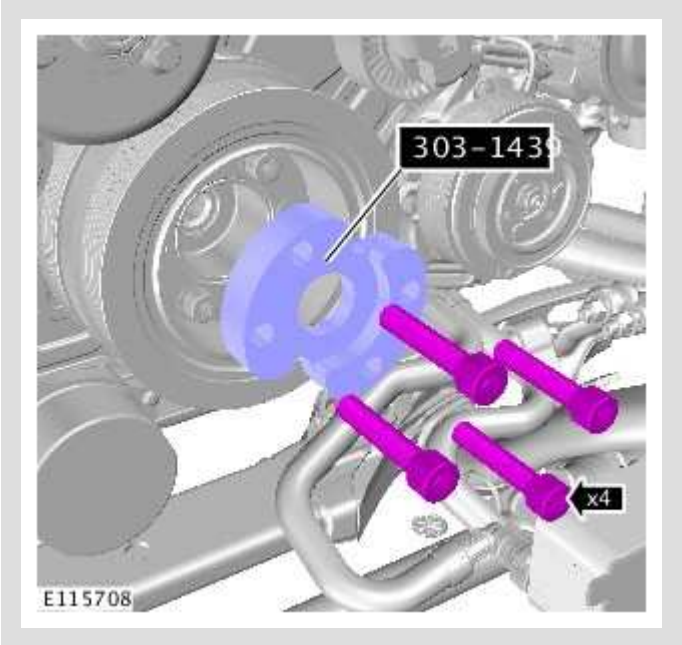
cardiagn.com



Install the special tool.

Special Tool(s): 303-1440

4.



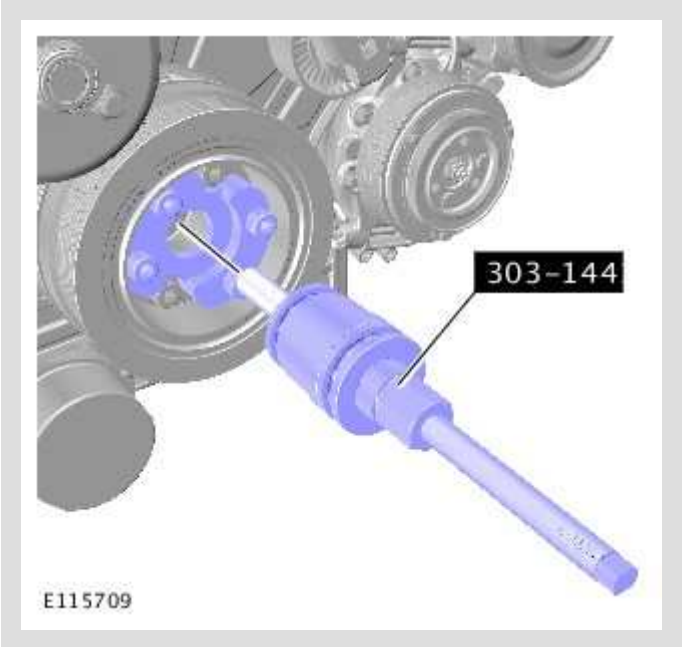
Install the special tool.

Special Tool(s): 303-1439

Torque: **25 Nm**

cardiagn.com

5.



Install the special tool.

Special Tool(s): 303-1441

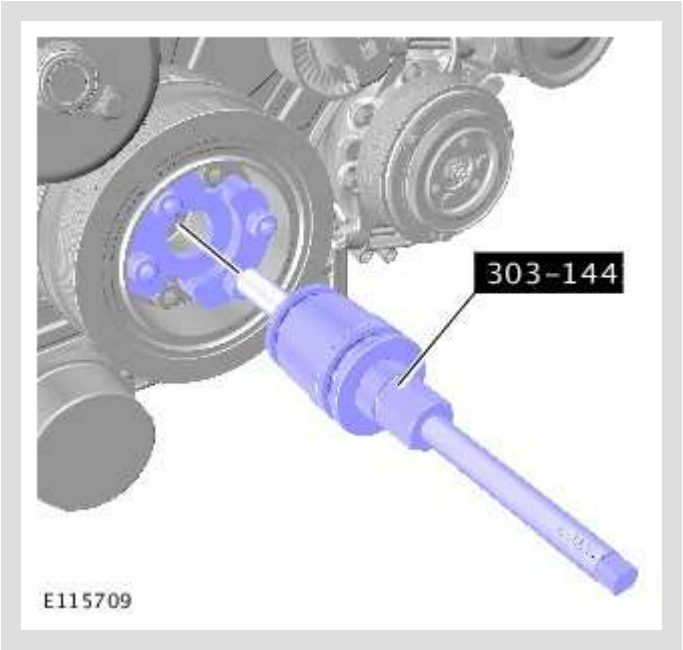
6.

CAUTION:

Rotate the crankshaft pulley installation tool until the pulley is fully located, do not over tighten. Failure to do this may result in damage to the components.

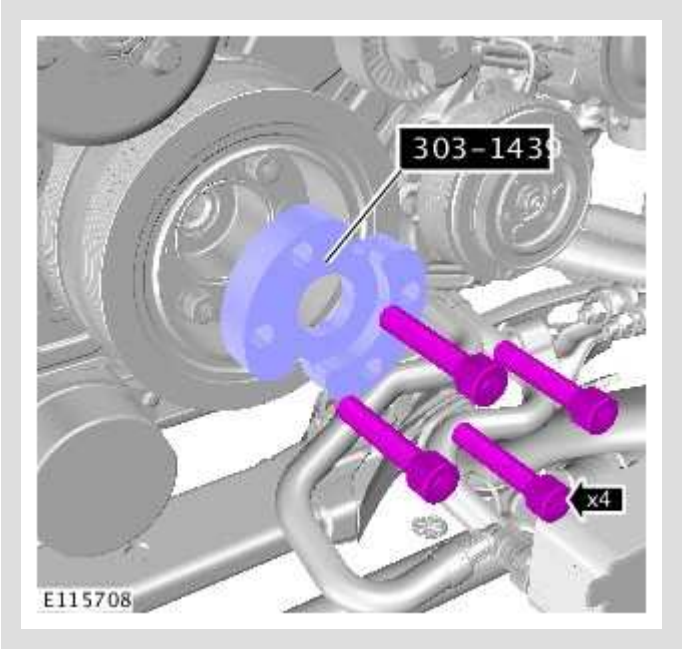
cardiagn.com

7.



Remove the special tool.

8.

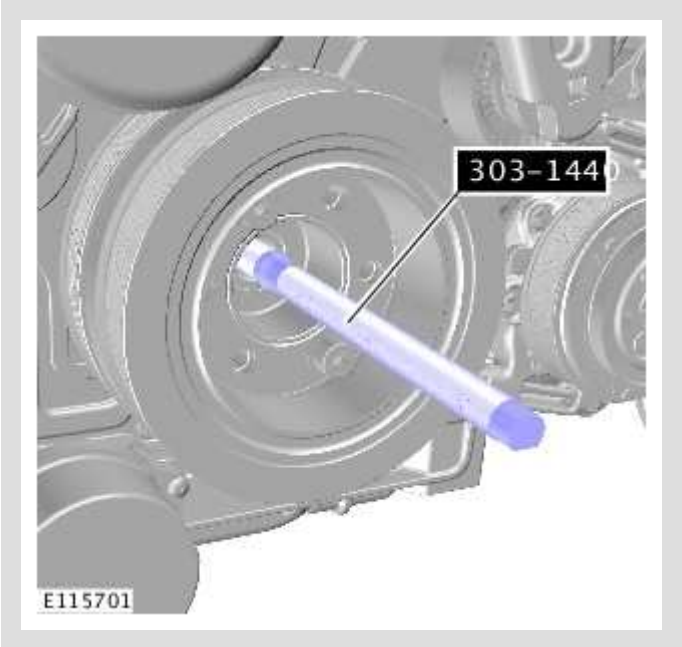


Remove the special tool.

Special Tool(s): 303-1439

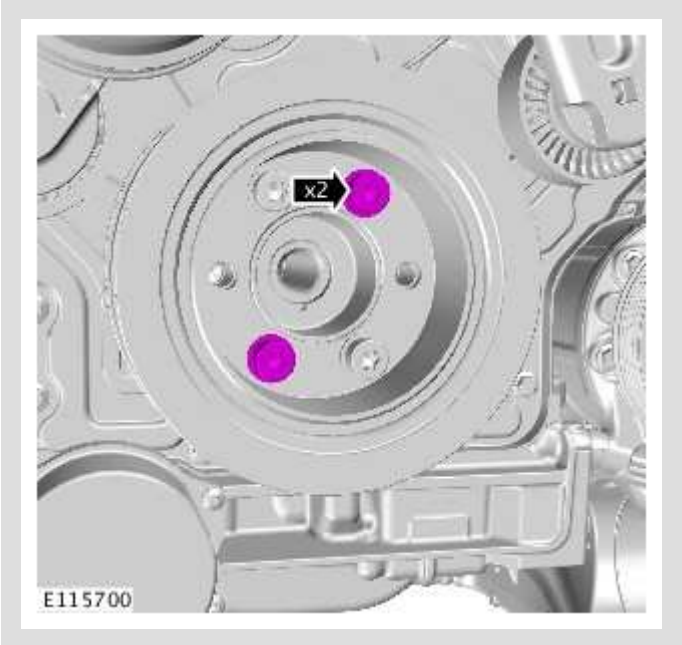
9.

cardiagn.com



Remove the special tool.

10.



CAUTION:

cardiagn.com

Make sure that a new bolts are installed.

Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

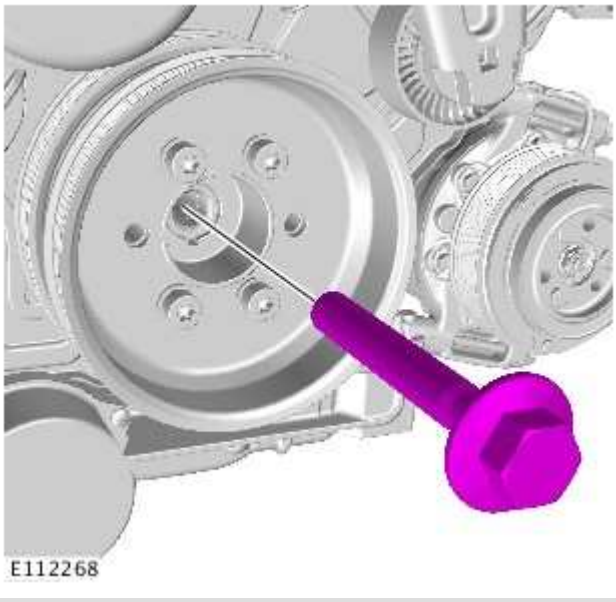
11.

WARNING:

Make sure that a new bolt is installed.

CAUTION:

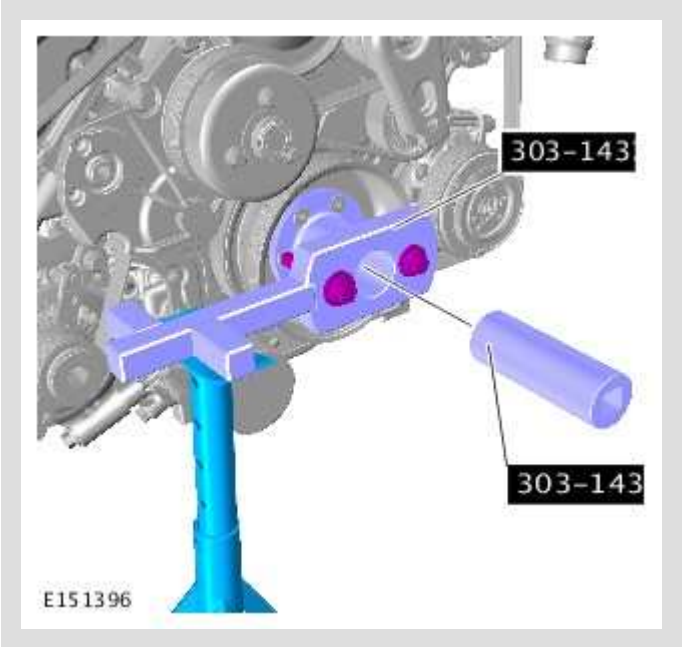
Tighten the component finger tight first.



Install the crankshaft pulley bolt.

12.

cardiagn.com

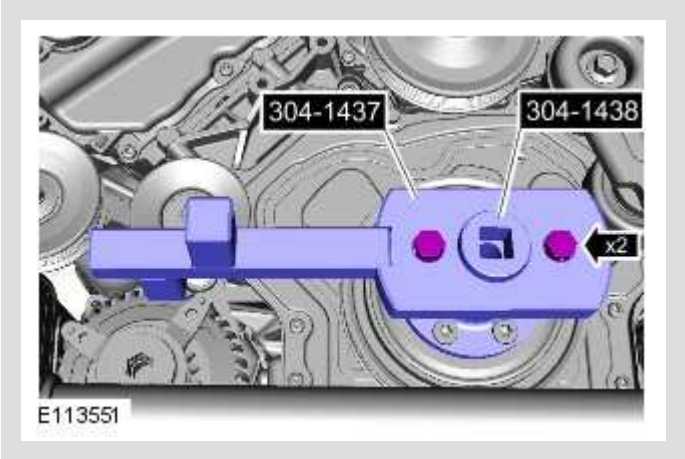


Install the special tools.

Special Tool(s): 303-1437

Special Tool(s): 303-1438

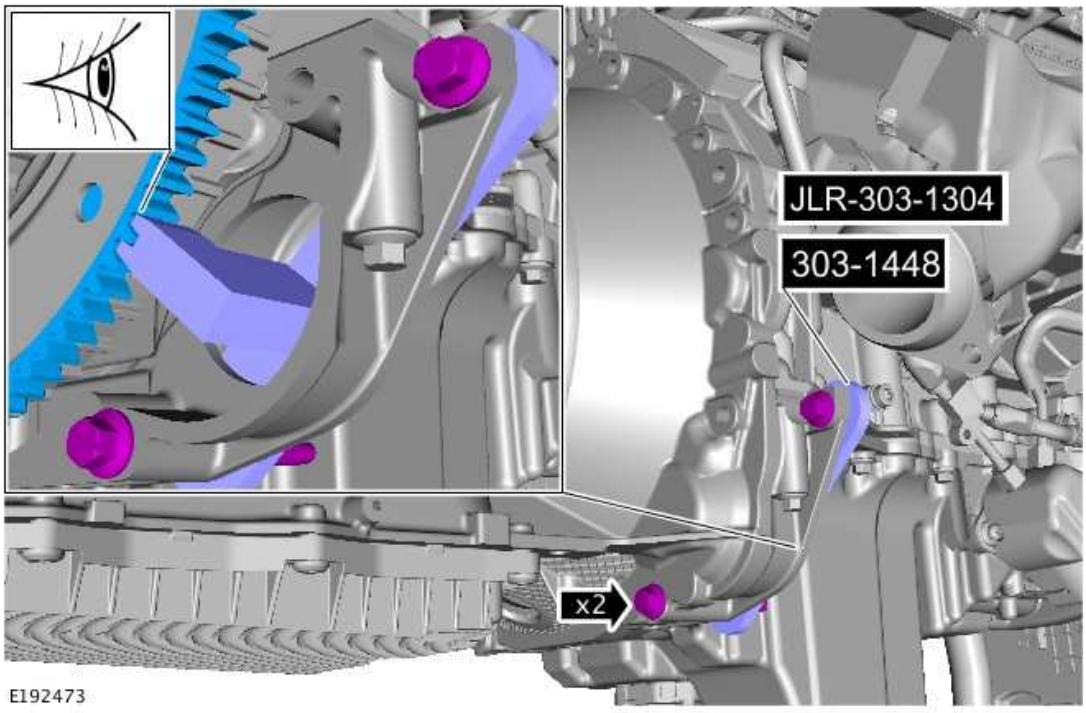
13.



Torque: **25 Nm**

14.

cardiagn.com



Remove the special tool.

Vehicles without Auto stop/start system.
Special Tool(s): 303-1448

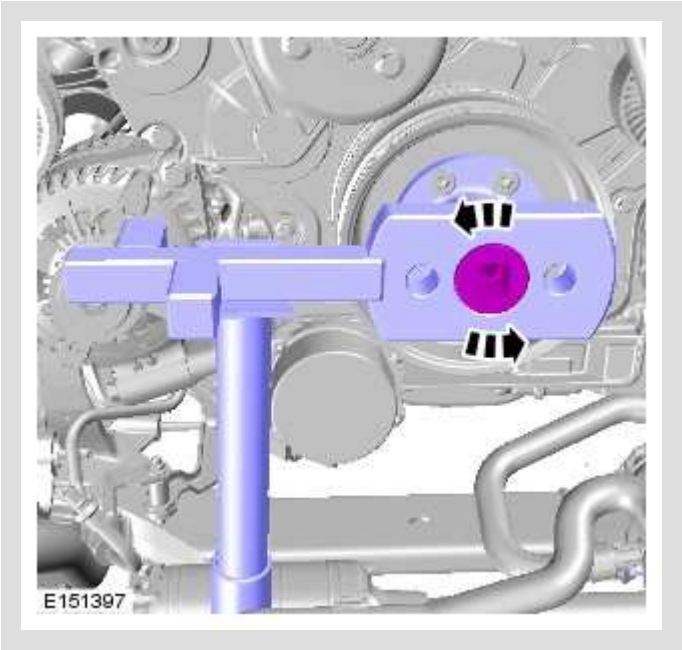
Vehicles with Auto stop/start system.
Special Tool(s): JLR-303-1304

15.

NOTES:

- The use of a torque multiplier capable of 600Nm will be required.
- The illustration shows the tool positioning for LH threaded crankshaft damper bolts, RH threaded crankshaft bolts will require the tool position to be the opposite direction.

cardiagn.com



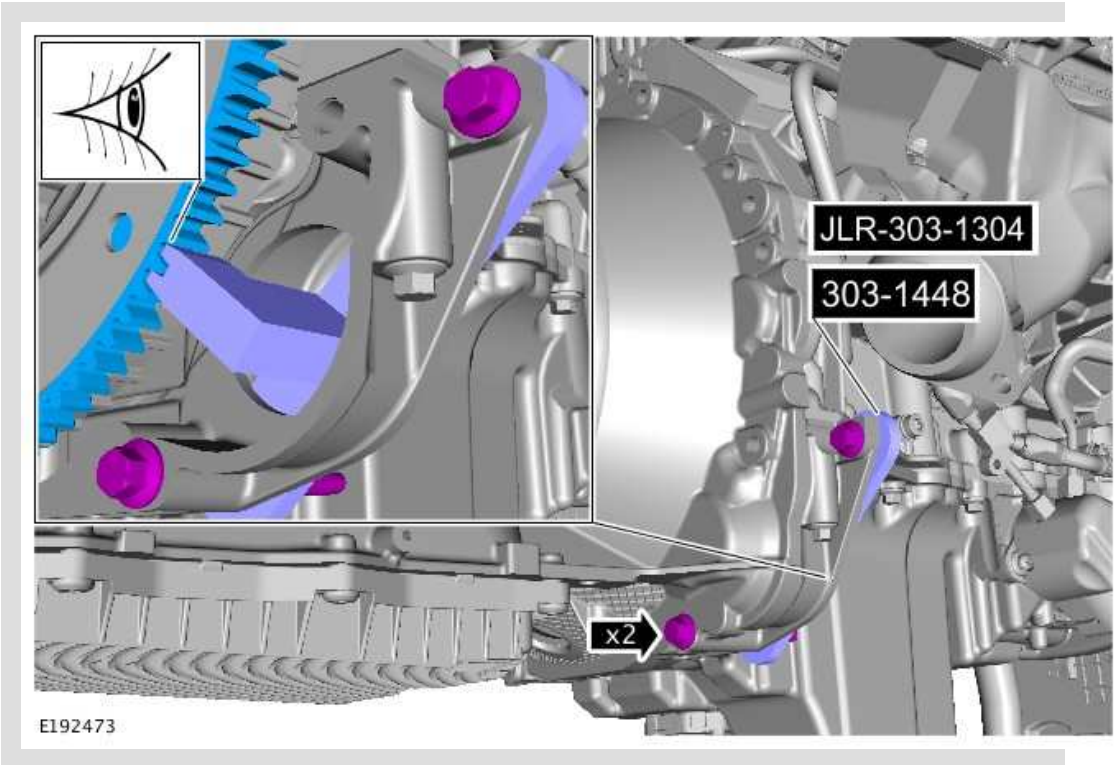
Tighten the crankshaft pulley bolt. Make sure that the socket is turned through 270 degrees not the torque wrench.

Torque:

Stage 1: **200 Nm**

Stage 2: **270°**

16.



cardiagn.com

Install the special tool.

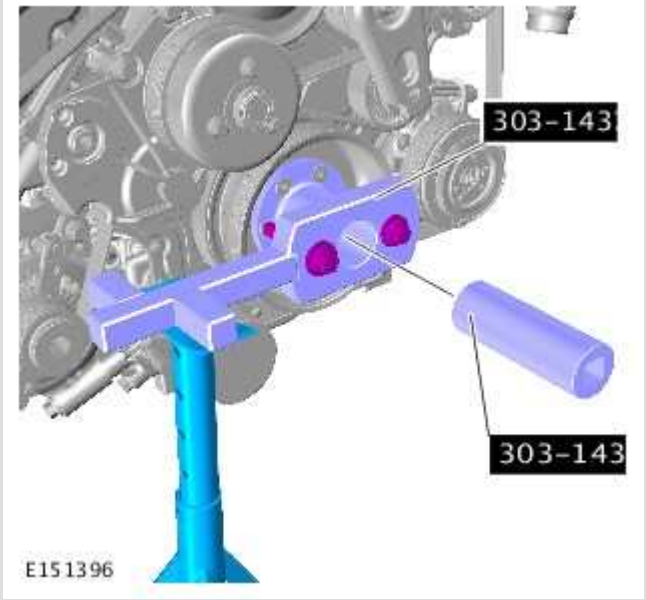
Vehicles without Auto stop/start system.

Special Tool(s): 303-1448

Vehicles with Auto stop/start system.

Special Tool(s): JLR-303-1304

17.



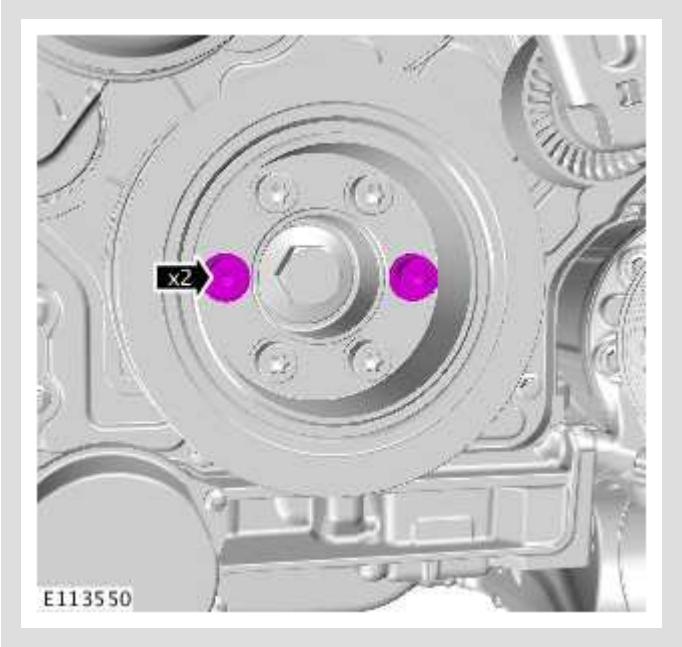
Remove the special tools.

18.

CAUTION:

Make sure that a new bolts are installed.

cardiagn.com

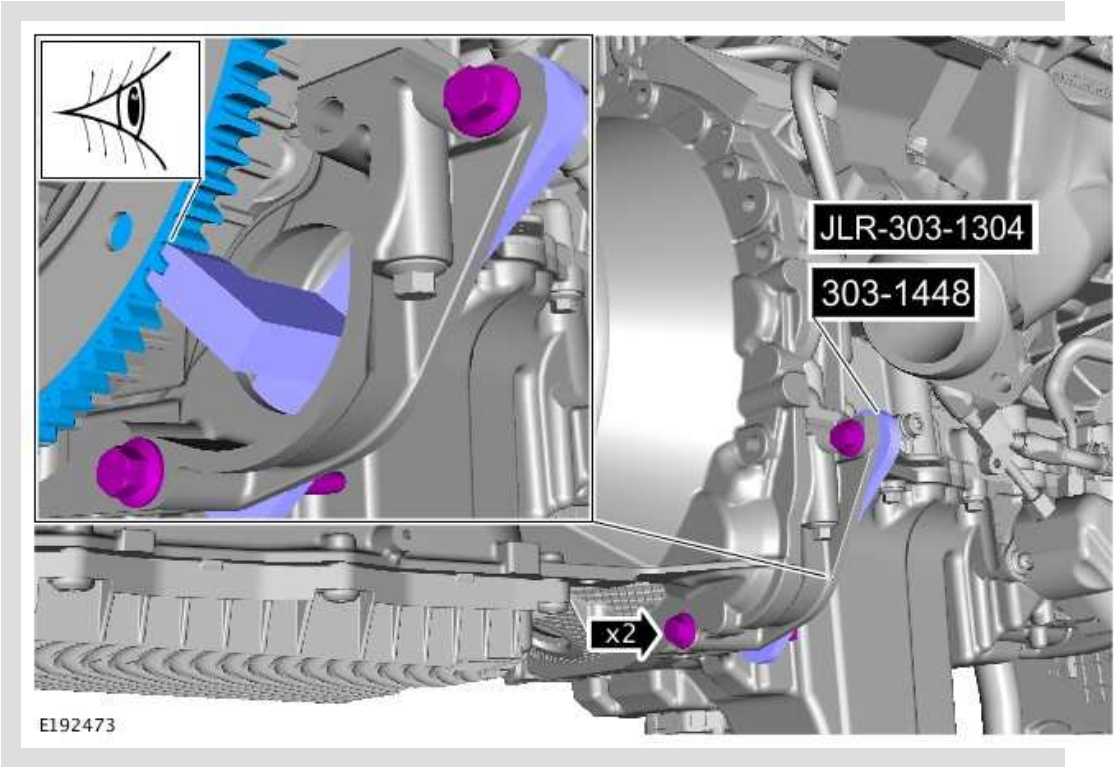


NOTE:

Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

cardiagn.com



Remove the special tool.

Vehicles without Auto stop/start system.

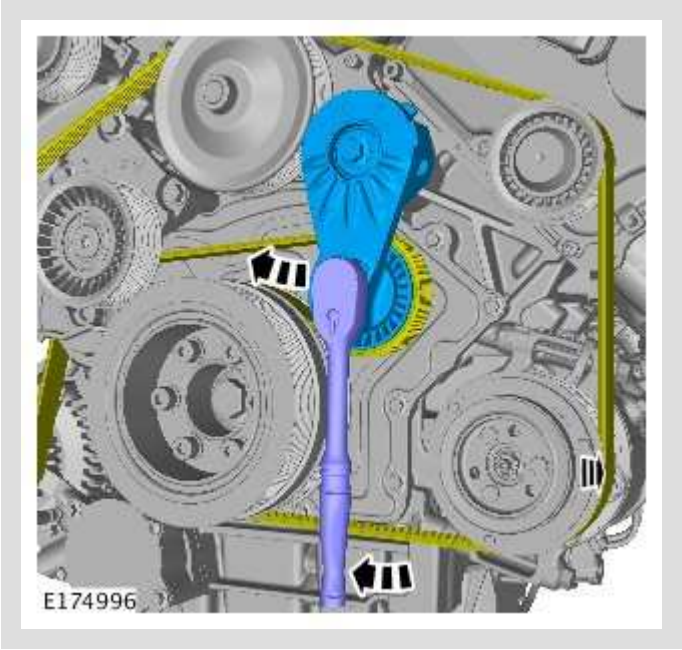
Special Tool(s): 303-1448

Vehicles with Auto stop/start system.

Special Tool(s): JLR-303-1304

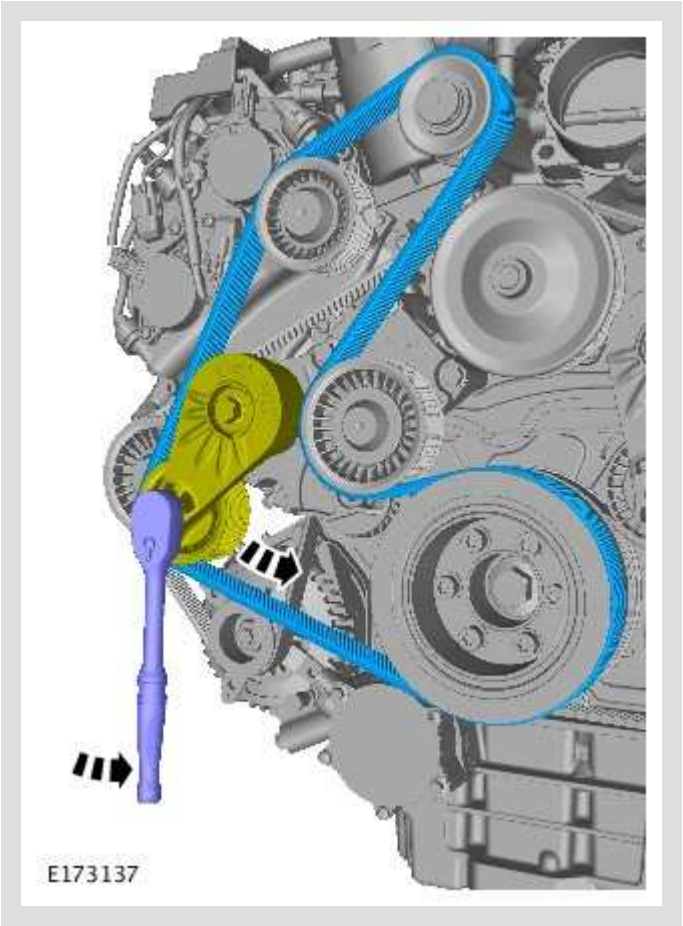
20.

cardiagn.com



21.

cardiagn.com



22. Install the cooling fan.
    Refer to: Cooling Fan (303-03C, Removal and Installation).

23. Install the starter motor.

cardiagn.com

Refer to: Starter Motor (303-06C, Removal and Installation).

24. Connect the battery ground cable.
Refer to: Specifications (414-01 Battery, Mounting and Cables, Specifications).

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

SPECIFICATIONS

Battery Specification

⚠ WARNINGS:

- Batteries produce explosive gases which may cause personal injury. Do not expose the battery to a naked flame. When charging or working near a battery wear protective clothing and eye protectors. Always provide adequate ventilation. Failure to follow these instructions may result in personal injury.
- Batteries contain sulphuric acid, avoid contact with skin, eyes and clothing. Shield your eyes when working near the battery to protect against possible contact of the acid solution. In case of contact with the skin or eyes, flush immediately for a minimum of 15 minutes and seek prompt medical attention. if swallowed call a physician immediately. Failure to follow these instructions may result in personal injury.

cardiagn.com

CAUTION:

Make sure all electrical systems are off before connecting the battery ground cable. Failure to follow these instructions may result in damage to the electrical system.

ENGINE SPECIFICATION	BATTERY TYPE	SPECIFICATIN
All	Varta T8	90Ah

Battery cold cranking Specification

ITEM	SPECIFICATION
90 Ah battery cold cranking	800 Amps

WARNING:

The backup power supply energy must be depleted before any supplementary restraint system repairs are carried out. To deplete the backup supply energy, first disconnect the battery ground cable, then disconnect the battery positive cable and wait ten minutes to avoid accidental deployment and personal injury. Failure to follow this instruction may result in personal injury.

CAUTION:

Disconnecting the battery cables will cause all of the electronic control modules to lose all stored data/fault codes.

NOTE:

cardiagn.com

Following reconnecting of the battery, the engine should be allowed to idle as the stored idle and drive values contained within the engine control module (ECM) will have been lost. This may cause driveability concern if the following procedure is not carried out.

BATTERY DISCONNECT PROCEDURE	BATTERY CONNECT PROCEDURE
1. If possible, apply parking brake or alternatively, chock wheels.	1. Connect the battery cables and tighten to 6 Nm. Ground cable must be connected last
2. If required, record any customer audio and climate control settings. This also applies to all electronic control module stored information.	2. Install the battery cover and close the luggage compartment lid.
3. Switch off ignition.	3. Start the engine and allow to idle until the engine reaches normal operating temperature.
4. Open the luggage compartment lid.	4. Switch the engine off.
5. Release the cover and disconnect the battery ground cable.	5. Restart the engine and allow to idle for approximately two minutes (this will allow the ECM to learn the idle values).
6. If required, disconnect the battery positive cable.	6. Apply and hold the brake pedal, select drive and allow the engine to idle for a further two minutes.
	7. Drive the vehicle for approximately five miles/eight kilometres of varied driving to enable the ECM to complete it's learning strategy.
	8. Reset the audio unit and climate control assembly to original customer settings.
	9. Reset the door window motors. For additional information, refer to: Door Window Motor Initialization (501-11 Glass, Frames and Mechanisms, General Procedures).

Torque Specifications

cardiagn.com

DESCRIPTION	NM	LB-FT	LB-IN
Battery positive cable terminal retaining nut	6	4	-
Battery negative cable retaining nut	6	4	-
Battery clamp bolts	25	18	-

cardiagn.com

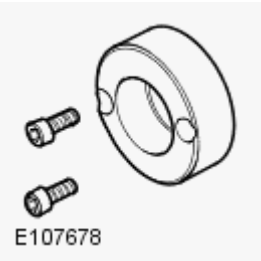
ENGINE - V6 S/C 3.0L PETROL

CRANKSHAFT REAR SEAL (G1584104)

REMOVAL AND INSTALLATION

12.21.20	CRANKSHAFT REAR OIL SEAL - RENEW	3000 CC, AJ V6 (AJ126), 2WD	5.4	USED WITHINS	
12.21.20	CRANKSHAFT REAR OIL SEAL - RENEW	3000 CC, AJ V6 (AJ126), MANUAL TRANSMISSION, 2WD	4.1	USED WITHINS	

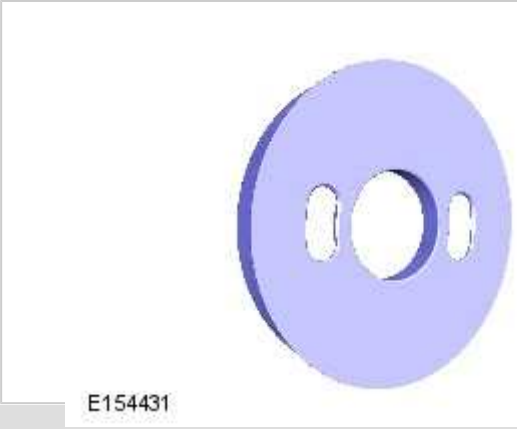
SPECIAL TOOL(S)



303-1442

Rear Crankshaft Seal Installer

cardiagn.com

	**JLR-303-1622** Alignment Tool, Engine Rear Oil Seal

REMOVAL

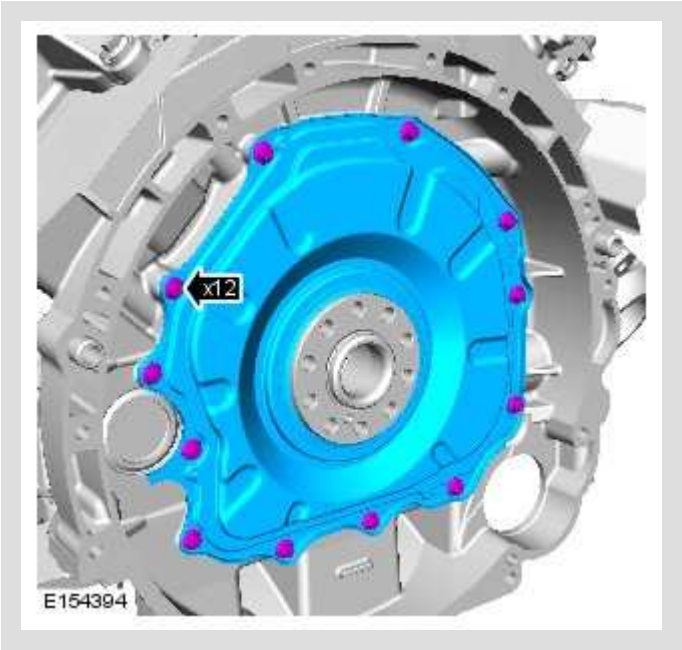
NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Flexplate (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

2.

cardiagn.com



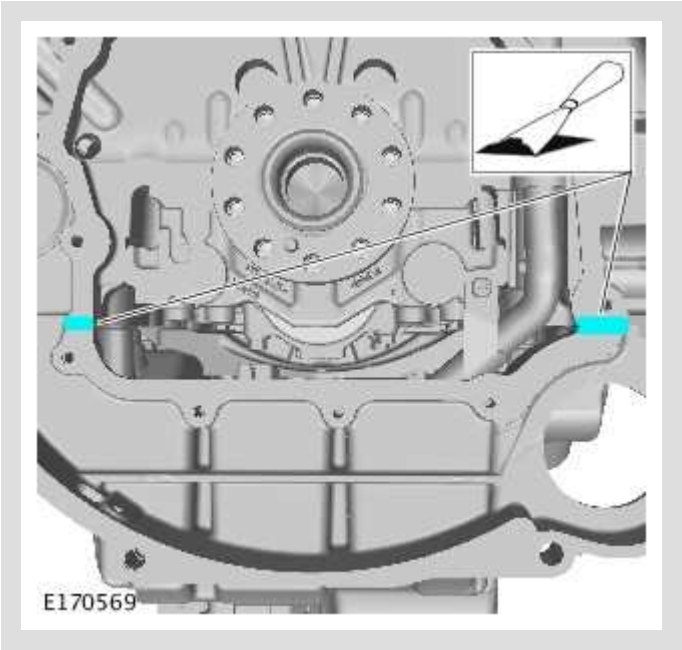
INSTALLATION

1.

CAUTIONS:

- Use only a plastic scraper when removing the sealing material.
- Make sure that the mating faces are clean and free of foreign material.
- Make sure that the Land Rover approved cleaning fluid (Loctite 7063) is used to clean the mating faces.

cardiagn.com

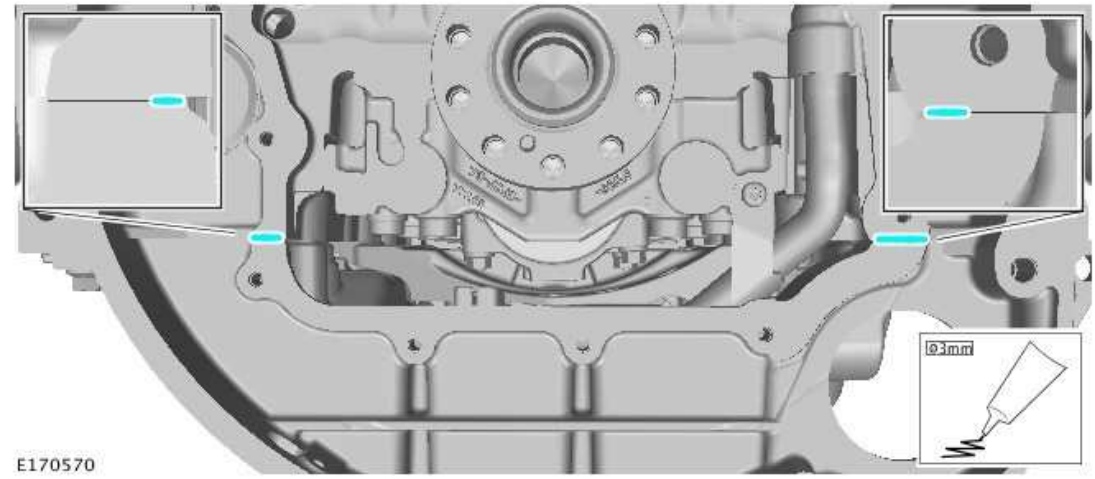


2.

CAUTION:

Make sure that the Land Rover approved sealant, covers the mating faces of the cylinder block and the oil pan.

cardiagn.com



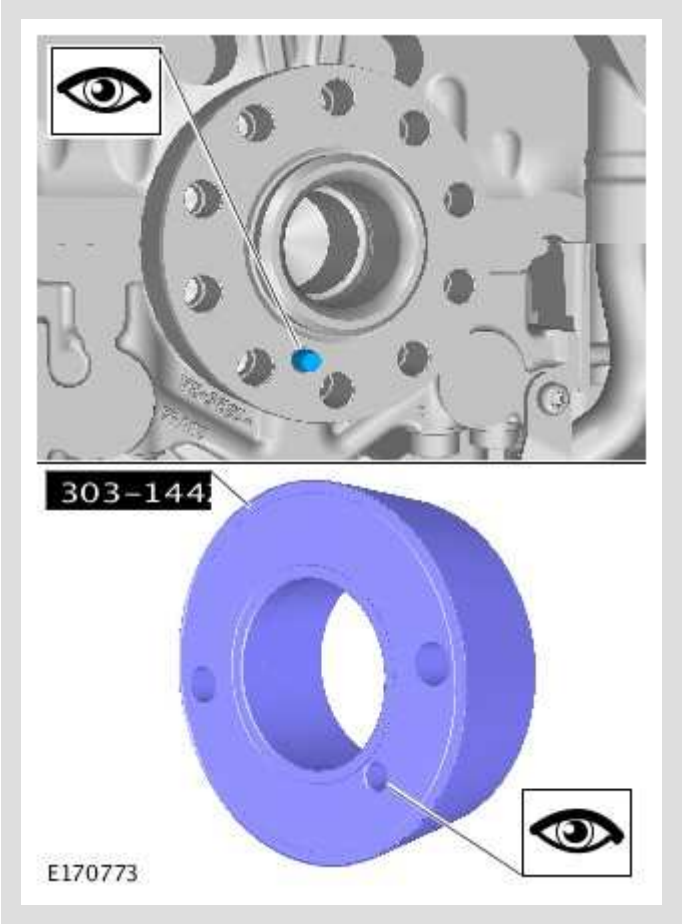
Apply RTV sealant (Loctite 5901G or Loctite 5900) in a 2-3mm diameter to the areas shown, and install the engine rear oil seal plate within 7 minutes.

3.

CAUTION:

Make sure that the special tool is correctly located.

cardiagn.com



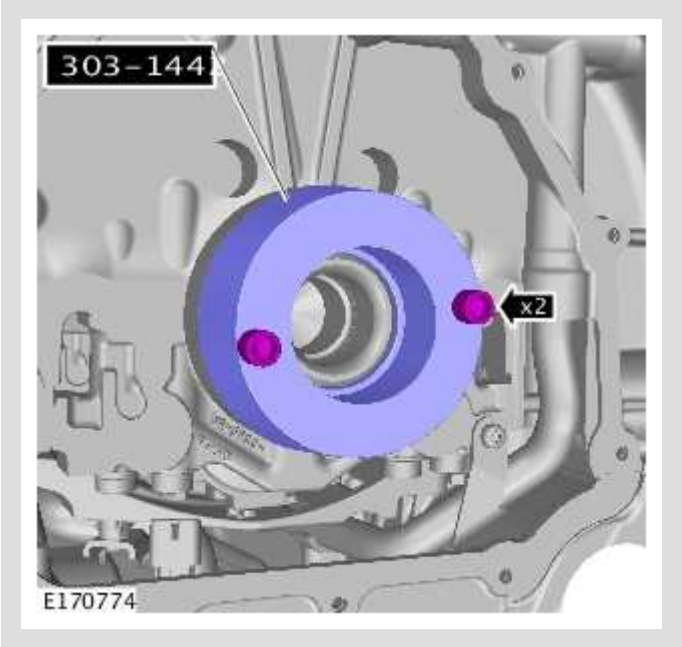
Special Tool(s): 303-1442

4.

NOTE:

Install the bolts finger tight.

cardiagn.com



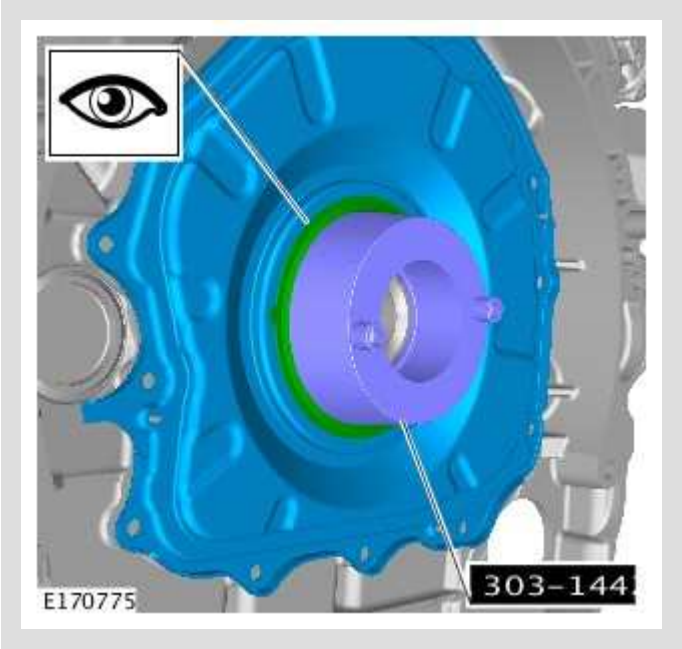
Install the special tool.
Special Tool(s): 303-1442

5.

CAUTION:

Do not fully install the component. Maintain a clearance of 8mm, between the rear oil seal plate and the cylinder block, as smearing of the sealant may occur.

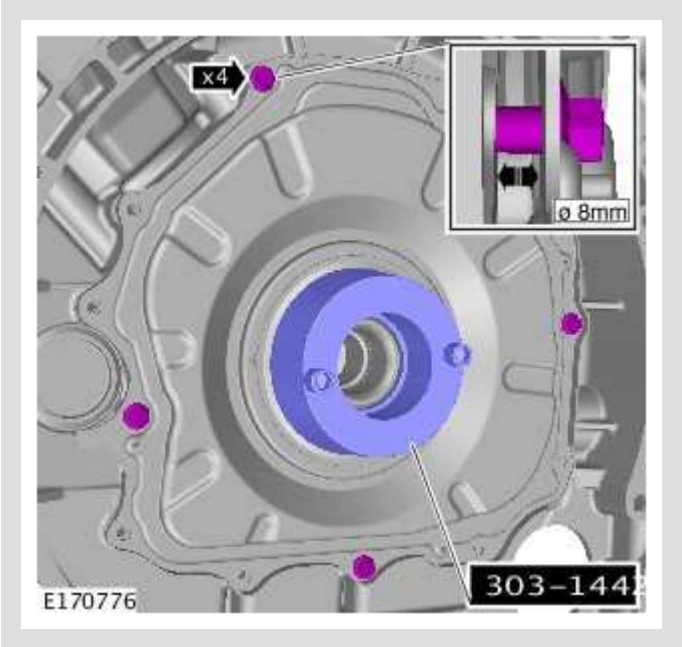
cardiagn.com



Special Tool(s): 303-1442

6.

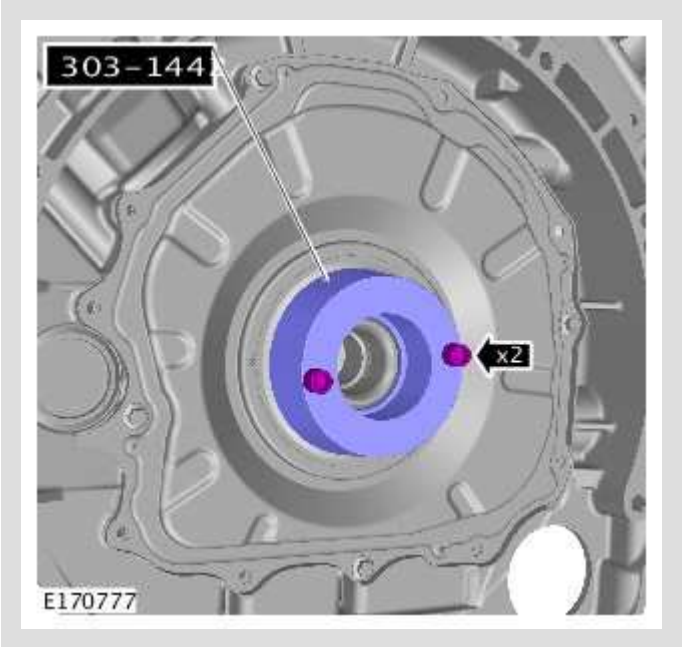
cardiagn.com



Install the bolts and maintain the clearance of 8mm.

Special Tool(s): 303-1442

7.



Remove the special tool.

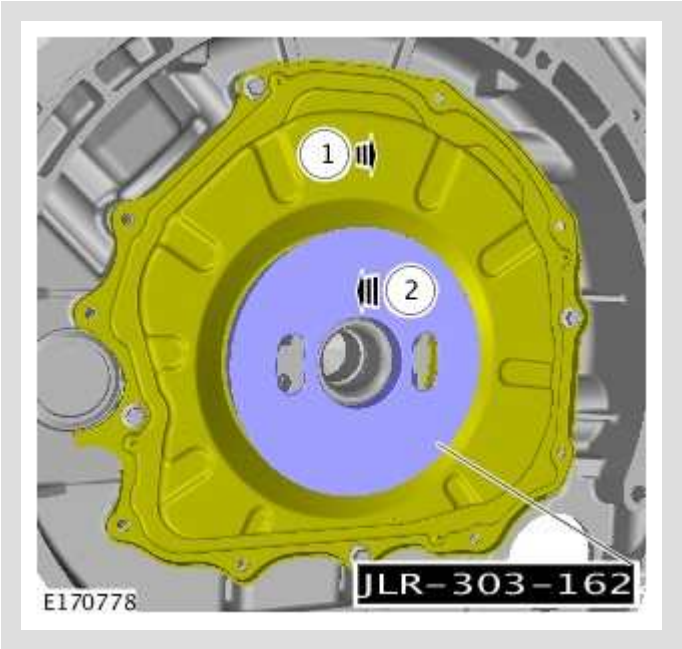
Special Tool(s): 303-1442

8.

CAUTION:

Apply pressure to the rear oil seal plate in the sequence shown, when installing the special tool.

cardiagn.com

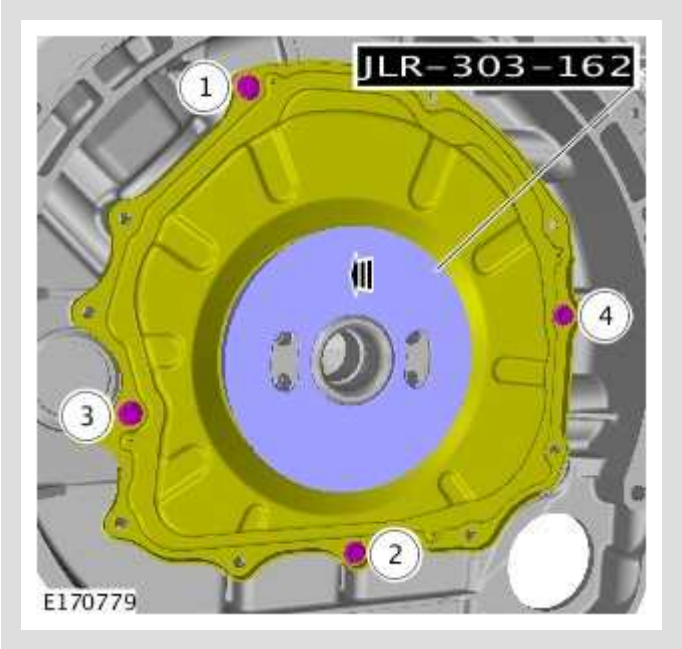


Special Tool(s): JLR-303-1622

9.

NOTE:

Tighten the bolts in the indicated sequence.



Using the special tool, install the component.

Special Tool(s): JLR-303-1622

Torque: **11 Nm**

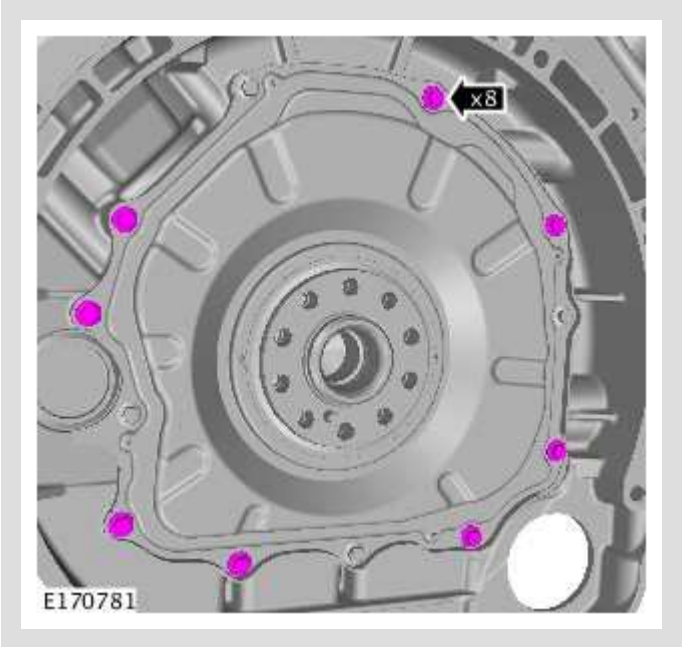
cardiagn.com

10.

Remove the special tool.

Special Tool(s): JLR-303-1622

11.



Torque: **11 Nm**

12. Refer to: Flexplate (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

cardiagn.com

ENGINE - V8 S/C 5.0L PETROL

FLEXPLATE (G1584111)

REMOVAL AND INSTALLATION

12.53.13	DRIVE PLATE - RENEW	3000 CC, AJ V6 (AJ126), 2WD	5.2	USED WITHINS	

SPECIAL TOOL(S)

JLR-303-1304

Locking Tool

REMOVAL

NOTES:

- Some components shown removed for clarity.

cardiagn.com

- Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. Refer to: Transmission (307-01A Automatic Transmission /Transaxle - V6 S/C 3.0L Petrol, Removal).
   Refer to: Transmission (307-01A Automatic Transmission /Transaxle - V6 S/C 3.0L Petrol, Removal).
   Refer to: Transmission (307-01B Automatic Transmission /Transaxle - V8 S/C 5.0L Petrol, Removal).

4. **CAUTIONS:**

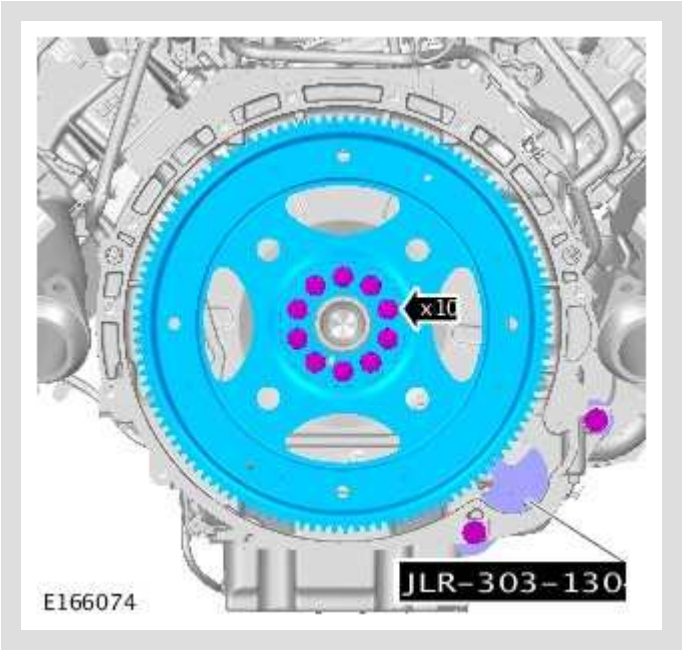
   - The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
   - Make sure that no components fall off during removal.

   NOTES:

   - Make sure the crankshaft and flexplate mating faces are clean before installation.

cardiagn.com

- Make sure that the crankshaft is not rotated.



Install the special tool.
Special Tool(s): JLR-303-1304

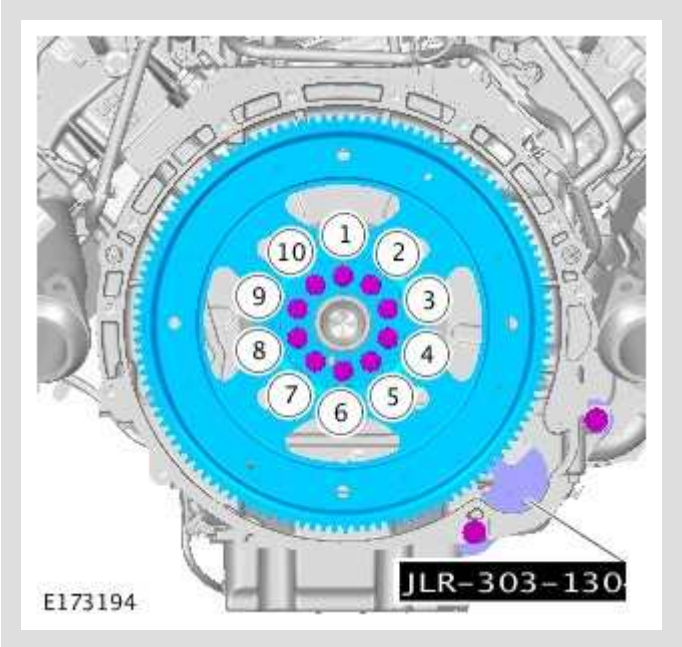
INSTALLATION

1.

CAUTIONS:

- The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
- Install all the bolts finger tight before final tightening.
- Install the bolts in the noted position.

cardiagn.com



Special Tool(s): JLR-303-1304

Torque:

Stage 1: **45 Nm**

Stage 2: **90°**

2. Remove the special tool.

3. Refer to: Transmission (307-01B Automatic Transmission /Transaxle - V8 S/C 5.0L Petrol, Installation).
Refer to: Transmission (307-01A Automatic Transmission /Transaxle - V6 S/C 3.0L Petrol, Installation).
Refer to: Transmission (307-01A Automatic Transmission /Transaxle - V6 S/C 3.0L Petrol, Installation).

4. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

CYLINDER HEAD LH (G1584105)

REMOVAL AND INSTALLATION

12.29.02	CYLINDER HEAD GASKET - LEFT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	19.8	USED WITHINS	
12.29.11	CYLINDER HEAD - LEFT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	19.8	USED WITHINS	
12.29.43	CAMSHAFT COVER - LEFT HAND - RENEW	3000 CC, AJ V6 (AJ126)	5.7	USED WITHINS	

SPECIAL TOOL(S)

cardiagn.com

E129632	**303-1492** Guide Sleeve, Cylinder Head Bolt

REMOVAL

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Engine shown removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2.

cardiagn.com

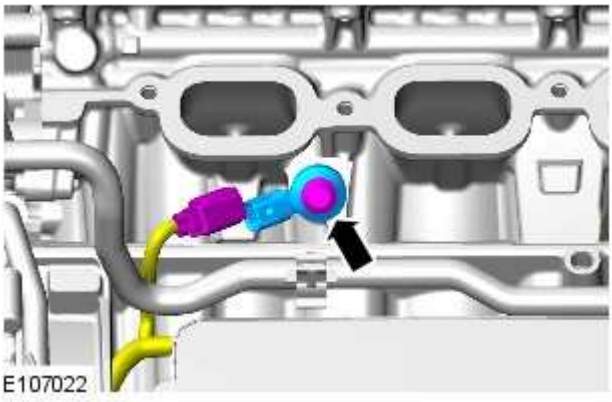
WARNING:

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

3. Refer to: Exhaust Manifold LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

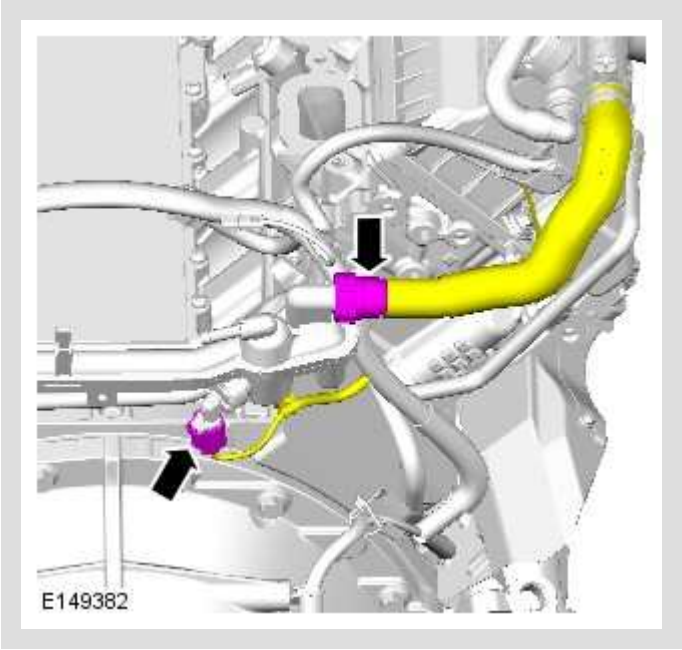
4. Refer to: Camshaft LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

5. 

6. **NOTE:**

Clamp the hose to minimize coolant loss.

cardiagn.com

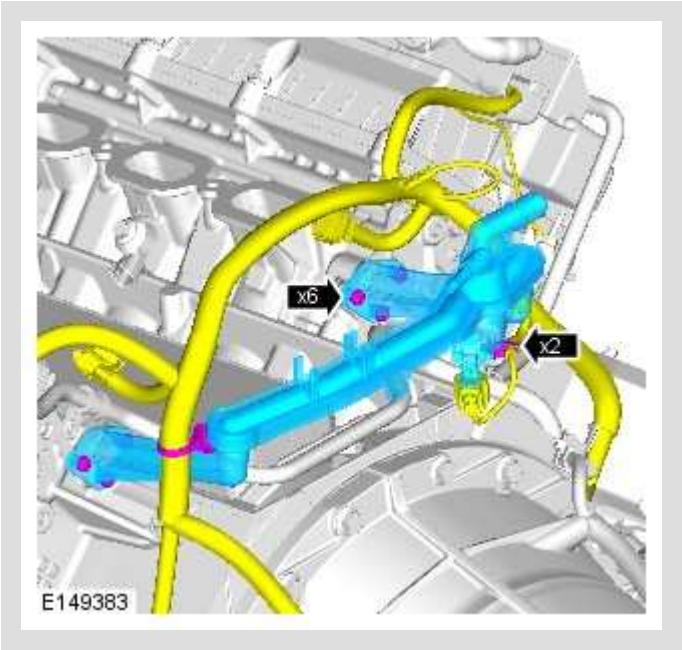


7.

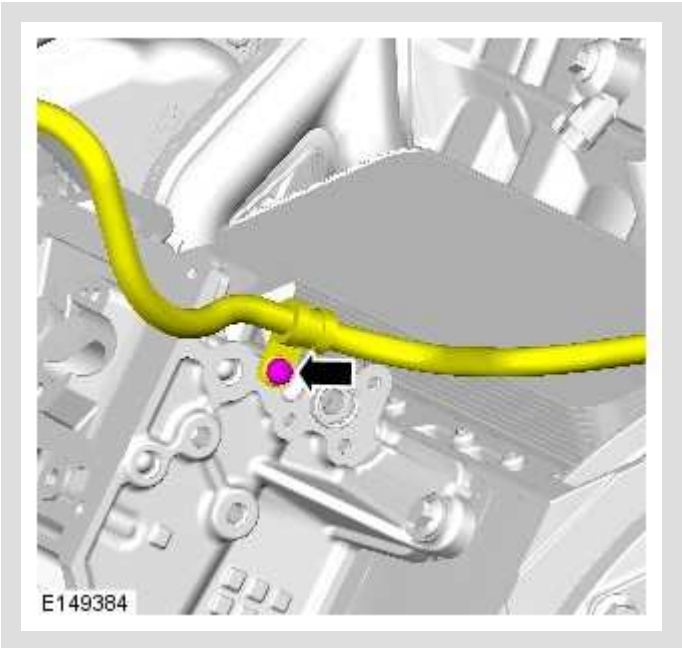
CAUTIONS:

- Be prepared to collect escaping coolant.
- Discard the seals.

cardiagn.com

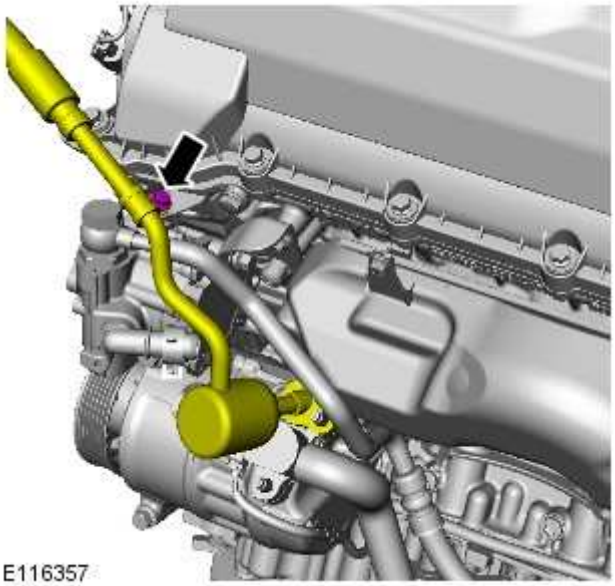


8.

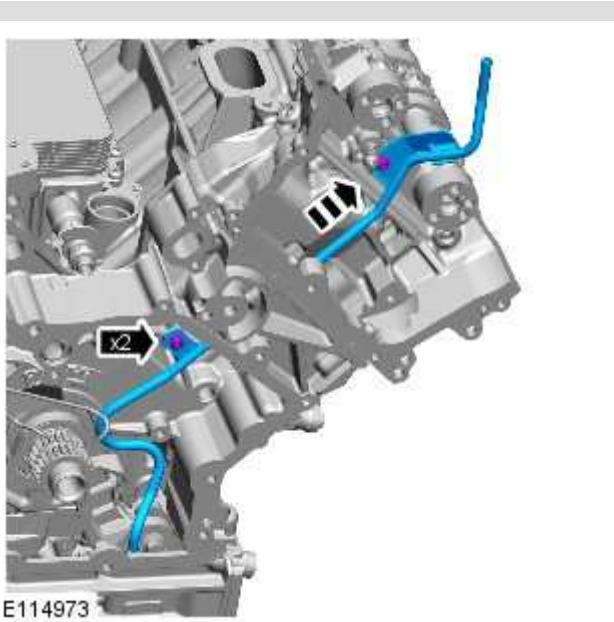


9.

cardiagn.com



10.

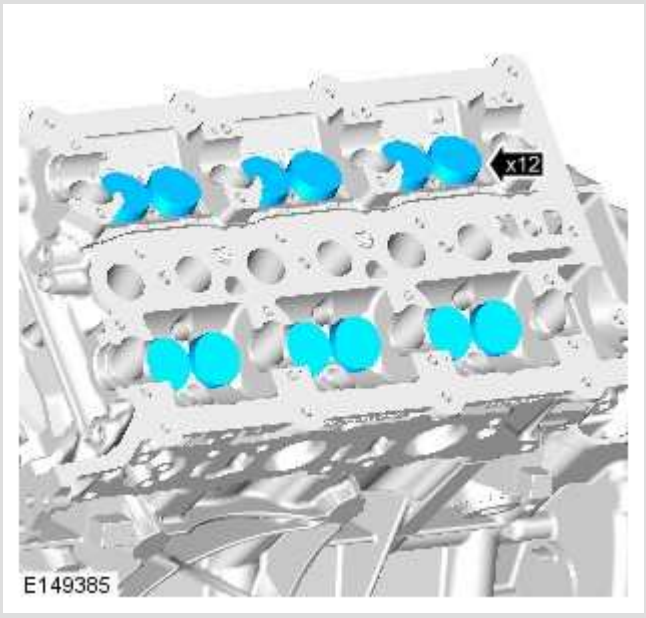


11.

cardiagn.com

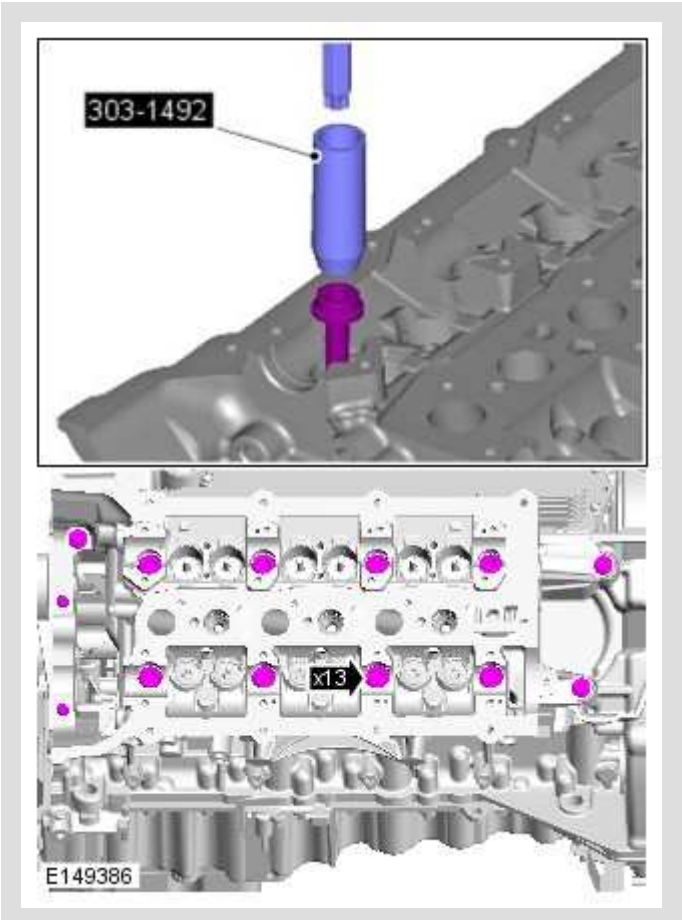
CAUTIONS:

- If a new cylinder head has been installed then new tappets must be installed.
- If the cylinder head is being removed without a new component being installed, the tappets must be installed in their original positions.



12.

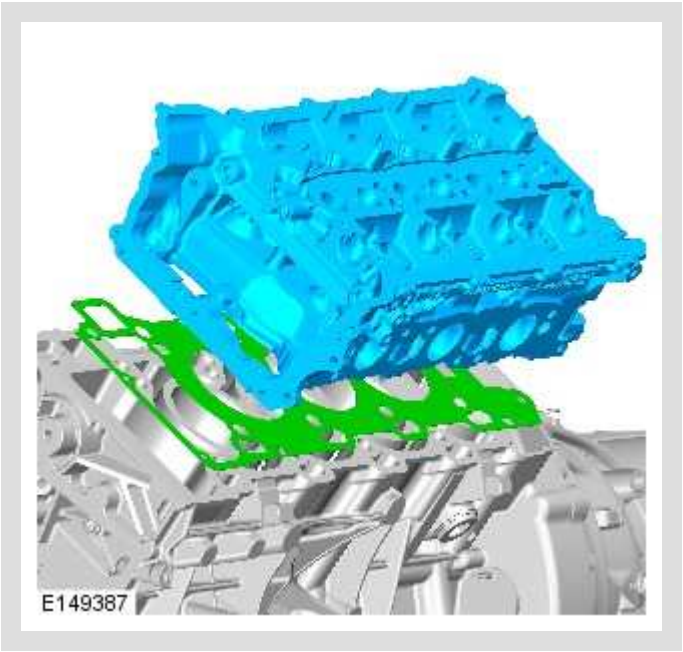
cardiagn.com



Special Tool(s): 303-1492

13.

cardiagn.com



INSTALLATION

1.

CAUTION:

An acceptable flatness of the cylinder head is 0.1mm.

Check cylinder head face for distortion, across the center and from corner to corner.

2.

WARNING:

Make sure care is taken when handling the cylinder head gasket.

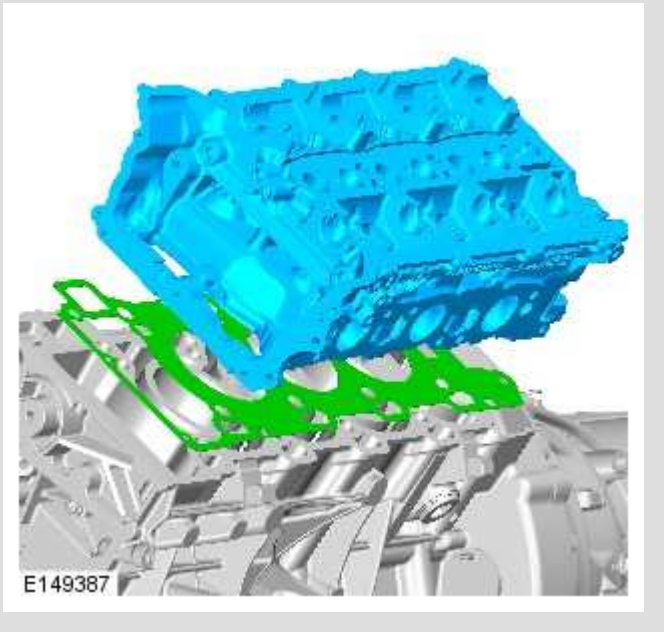
cardiagn.com

CAUTIONS:

- The head gasket must be installed over the cylinder block dowels.
- Make sure that the mating faces are clean and free of foreign material.

NOTE:

Install a new cylinder head gasket.



3.

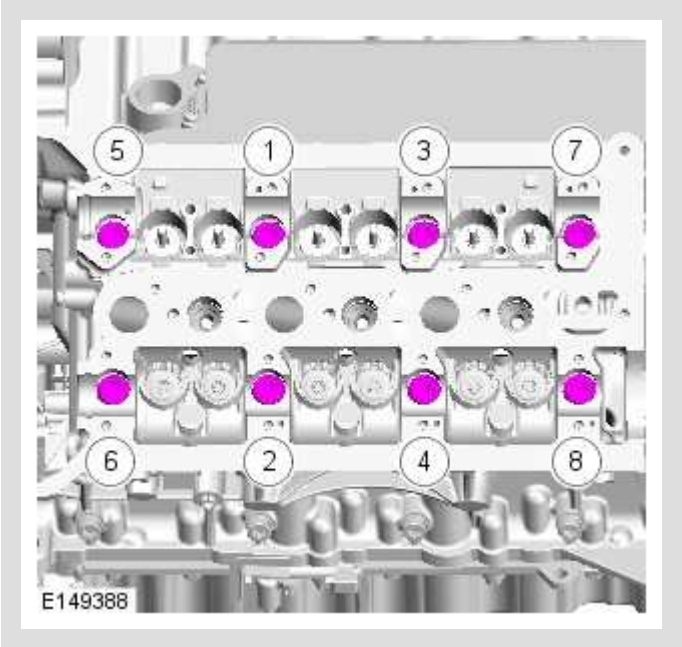
CAUTION:

Make sure that new cylinder head bolts are installed.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com

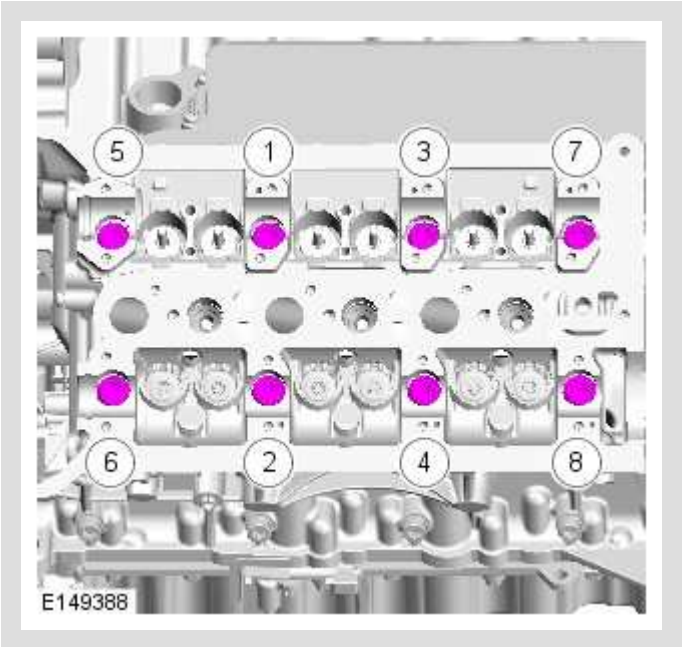


Torque: **20 Nm**

4.

NOTE:

Tighten the bolts in the indicated sequence.



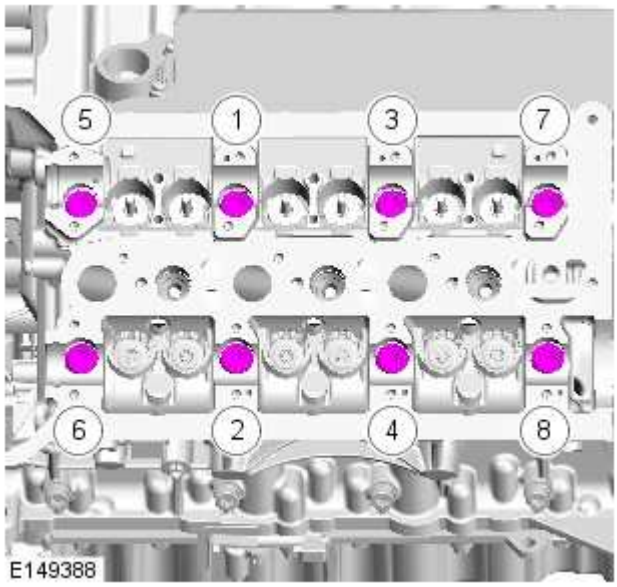
Torque: **35 Nm**

5.

cardiagn.com

NOTE:

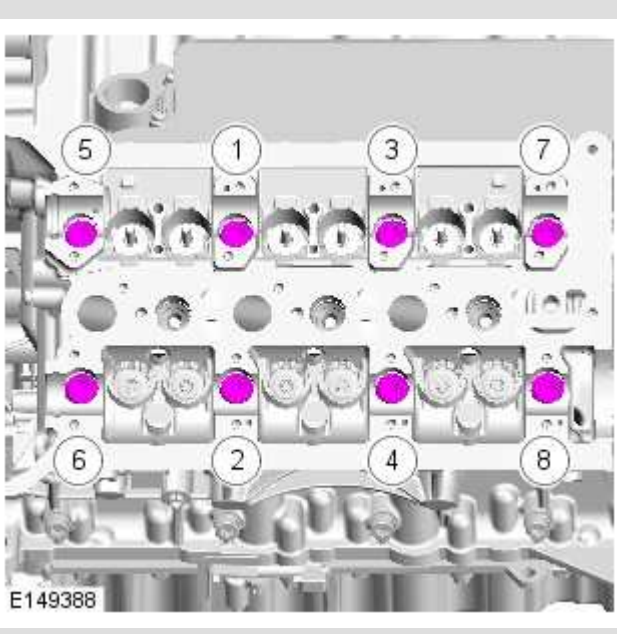
Slacken the bolts in the sequence shown.



6.

NOTE:

Tighten the bolts in the indicated sequence.



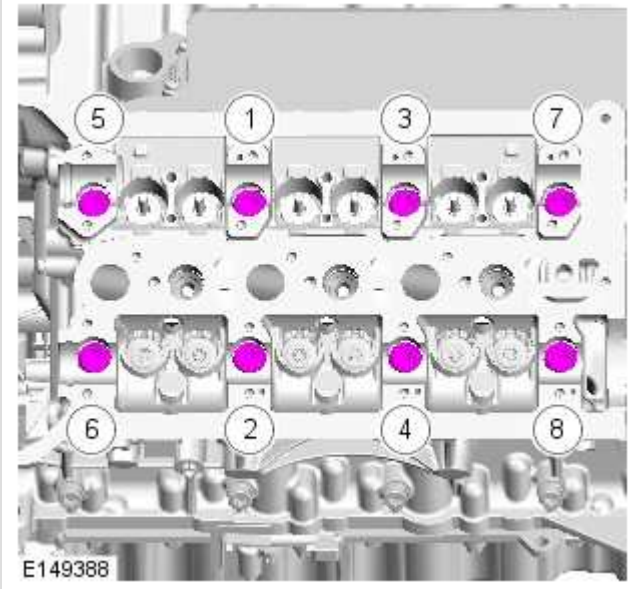
Torque: **35 Nm**

cardiagn.com

7.

NOTE:

Tighten the bolts in the indicated sequence.



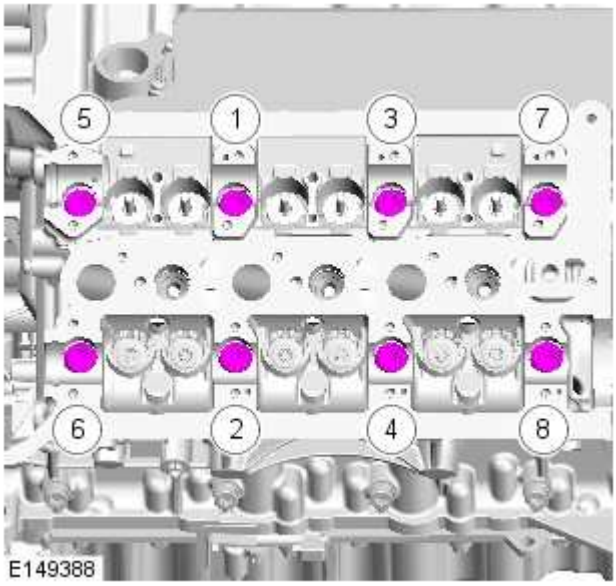
Tighten the bolts 1 to 8, a further 90 degrees.

8.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com

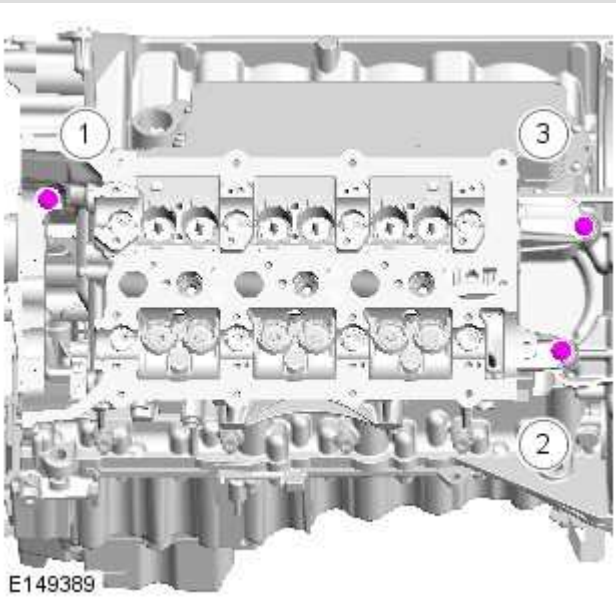


Tighten the bolts 1 to 8, a further 120 degrees.

9.

NOTE:

Tighten the bolts in the indicated sequence.



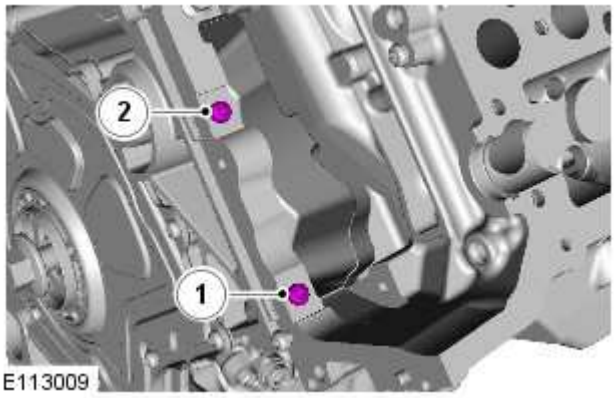
Torque: **25 Nm**

10.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com

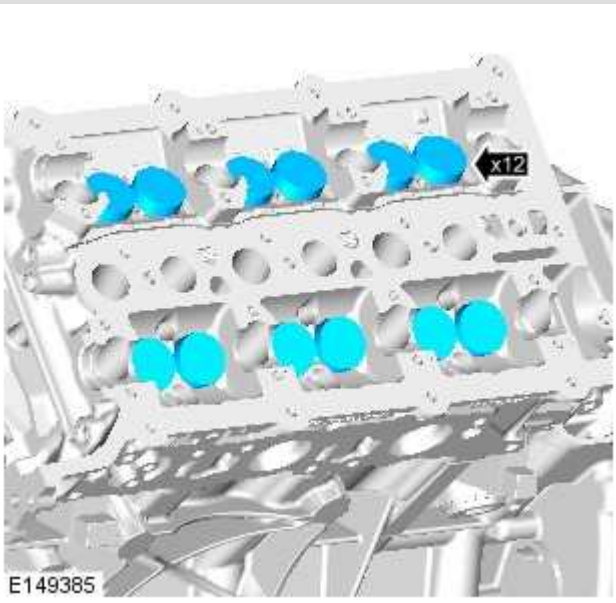


Torque: **12 Nm**

11.

CAUTIONS:

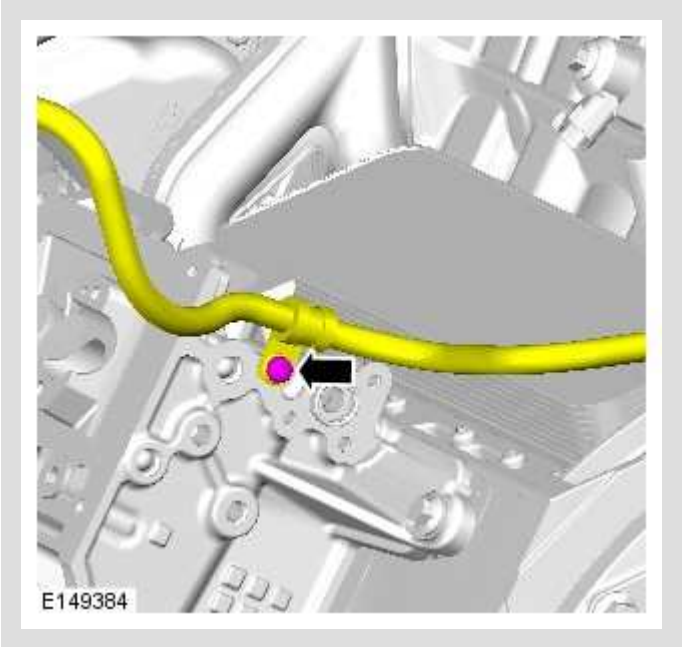
- If a new cylinder head has been installed then new tappets must be installed.
- If the cylinder head is being removed without a new component being installed, the tappets must be installed in their original positions.



Lubricate the valve tappets with clean engine oil.

12.

cardiagn.com

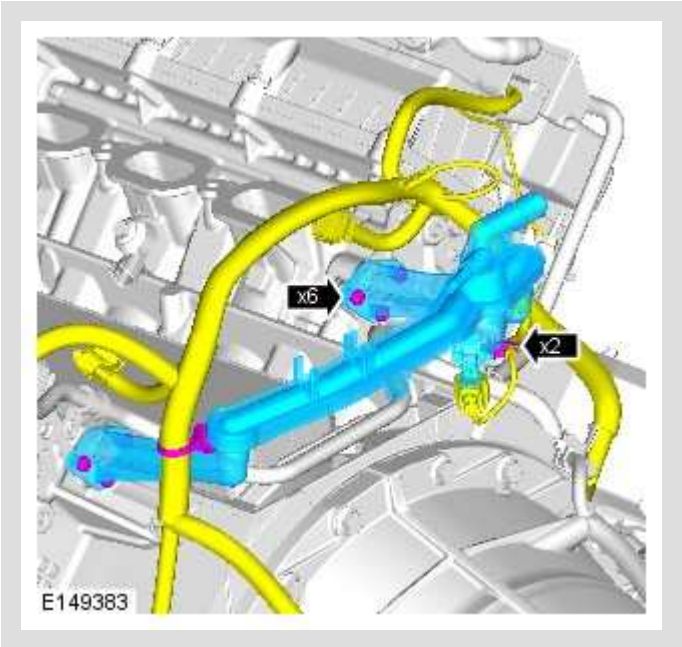


Torque: **10 Nm**

13.

CAUTION:

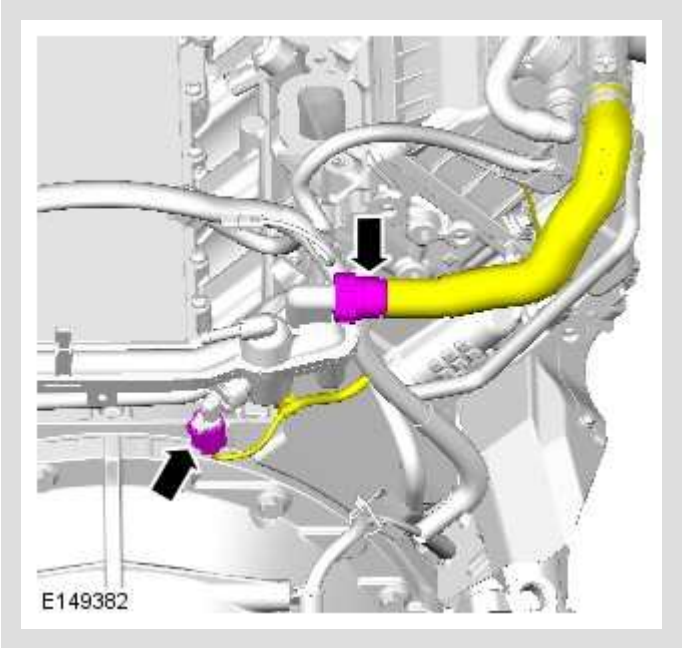
Install the new seals.



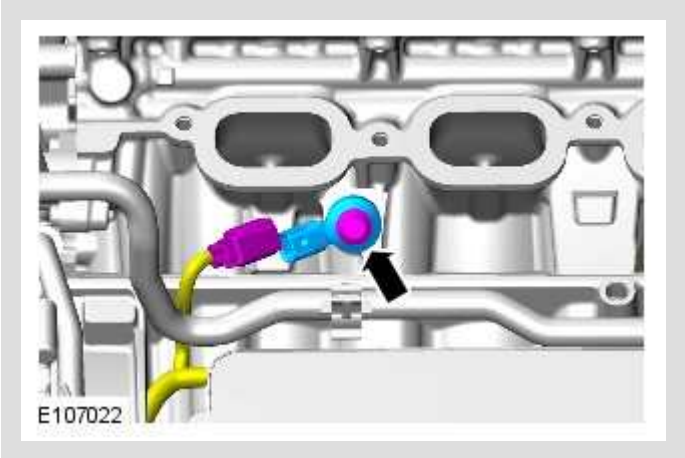
Torque: **10 Nm**

14.

cardiagn.com



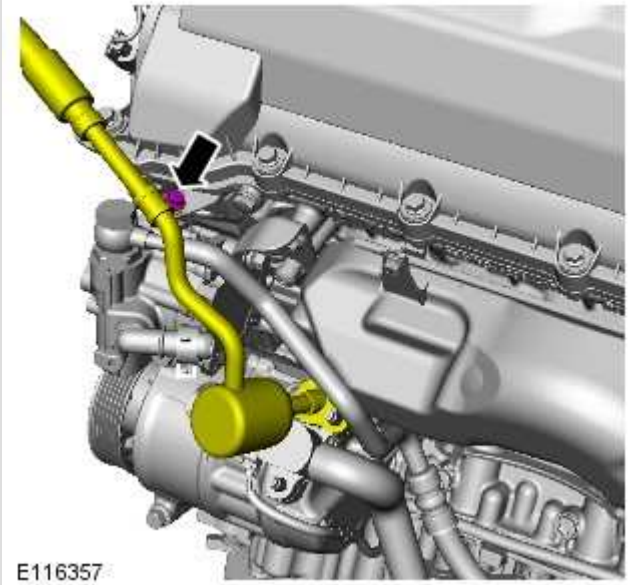
15.



Torque: **20 Nm**

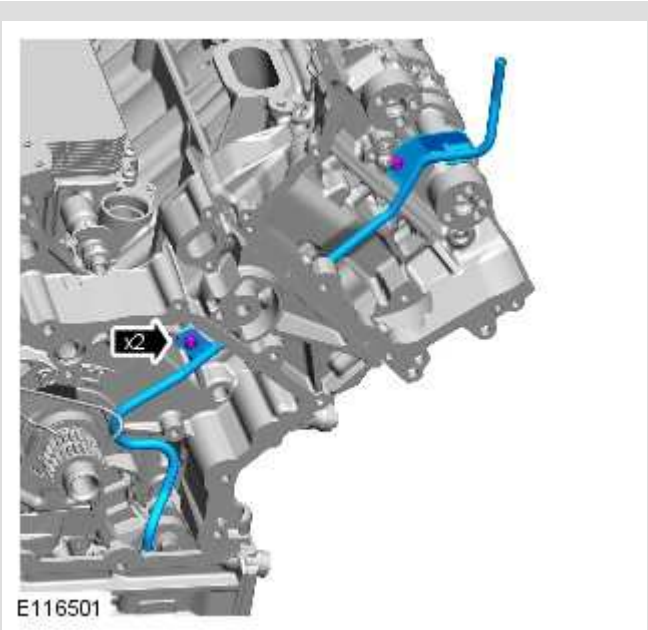
16.

cardiagn.com



Torque: **12 Nm**

17.



cardiagn.com

Torque: **12 Nm**

18. Refer to: Camshaft LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

19. Refer to: Exhaust Manifold LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

20. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

CAMSHAFT LH (G1584100)

REMOVAL AND INSTALLATION

12.13.01	CAMSHAFT - ENGINE SET - RENEW	3000 CC, AJ V6 (AJ126)	20.1	USED WITHINS	
12.13.19	CAMSHAFT - BANK 2 SET - RENEW	3000 CC, AJ V6 (AJ126)	17.8	USED WITHINS	

REMOVAL

CAUTION:

cardiagn.com

Make sure that the orientation and code on the top of the camshaft bearing caps is noted (along with the bank - A or B), so that on installation the components are installed to their original position. Failure to follow this instruction may cause damage to the vehicle.

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

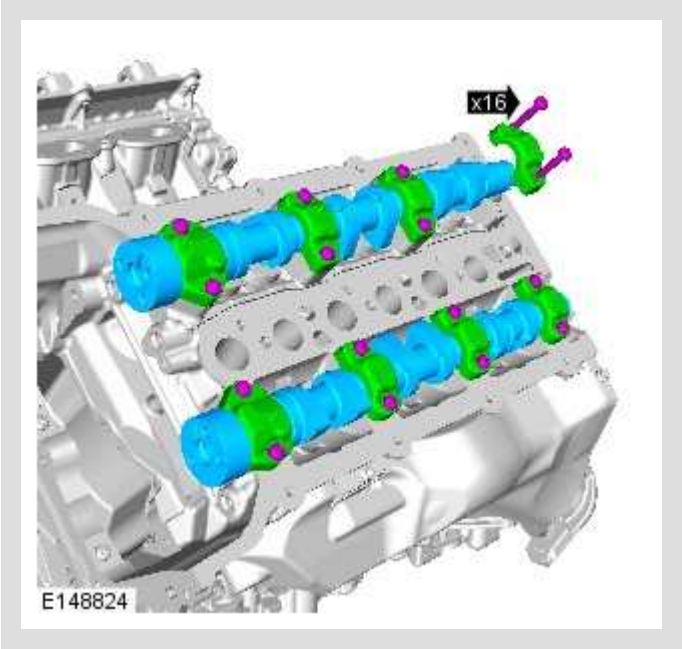
4. **CAUTIONS:**

   - Rotate the camshafts until all the valves are at their minimum open point.
   - Evenly and progressively, release the camshaft bearing caps.

cardiagn.com

NOTE:

Remove the camshaft bearing caps. Note: their position, orientation and markings. Each is marked with its position (number) and an orientation (arrow).



INSTALLATION

1.

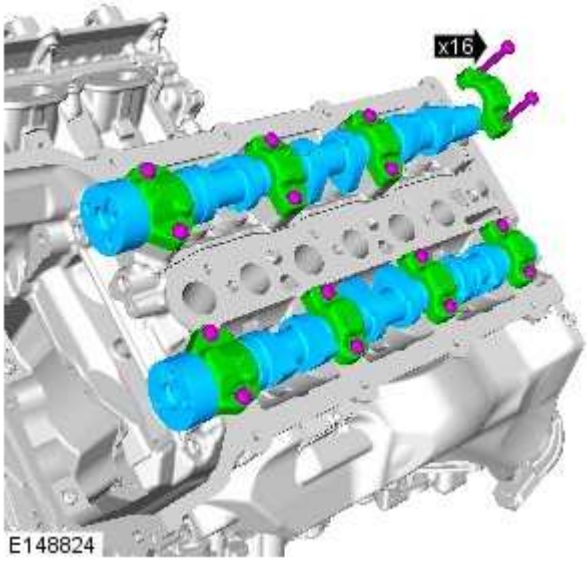
CAUTIONS:

- Prior to installing the camshafts, position the crankshaft 45 degrees ATDC cylinder 1A to prevent valve/piston collision.
- Make sure that the camshafts and camshaft bearing caps are installed in their original locations.
- Evenly and progressively install and tighten the camshaft bearing caps.

NOTE:

cardiagn.com

Lubricate the camshafts and the camshaft bearing caps with EP90 oil (or 75/90 viscosity oil will suffice) prior to installation.

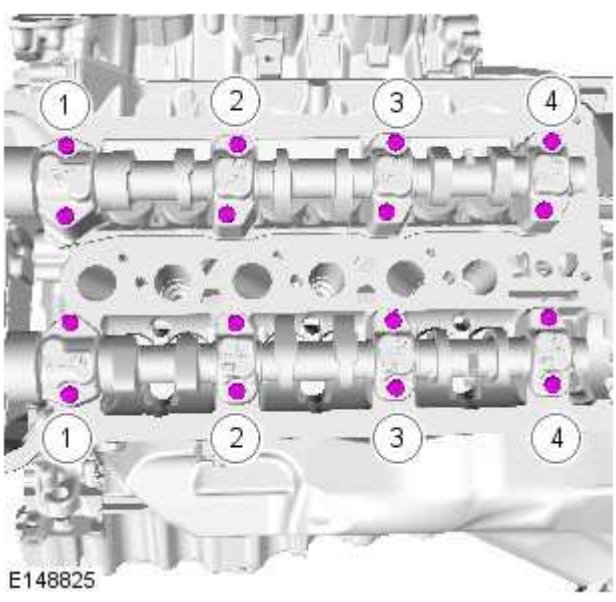


Torque: **3 Nm**

2.

NOTE:

Tighten the bolts in the indicated sequence.



cardiagn.com

Torque: **12 Nm**

3.

CAUTION:

Only rotate the crankshaft clockwise.

Rotate the crankshaft untill the camshaft lobe on the valve being checked is 180 degrees from the maximum opening position.

4.

NOTE:

If the valve clearance is incorrect, continue to the next step. If the valve clearance is correct, continue to step 8.

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

5.

CAUTIONS:

- Do not use a magnet to remove the tappet.
- Use the following formula to calculate the required bucket thickness. Original thickness + measured clearance - desired clearance = required bucket thickness.

Remove the tappet and measure the thickness.

6.

NOTE:

If a new tappet is installed then go back to step 1 of the install procedure.

cardiagn.com

Install a new tappet if required.

7. Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

8. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

9. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

EXHAUST MANIFOLD LH (G1584109)

REMOVAL AND INSTALLATION

30.15.55	EXHAUST MANIFOLD LEFT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	2.7	USED WITHINS	

SPECIAL TOOL(S)

cardiagn.com

	303-1444-01 Exhaust Manifold Installation Guide Pins - Threaded
	303-1444-02 Exhaust Manifold Installation Guide Pins - Unthreaded

REMOVAL

△ NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

cardiagn.com

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

3. Refer to: Exhaust System (309-00A Exhaust System - V6 S/C 3.0L Petrol, Removal and Installation).

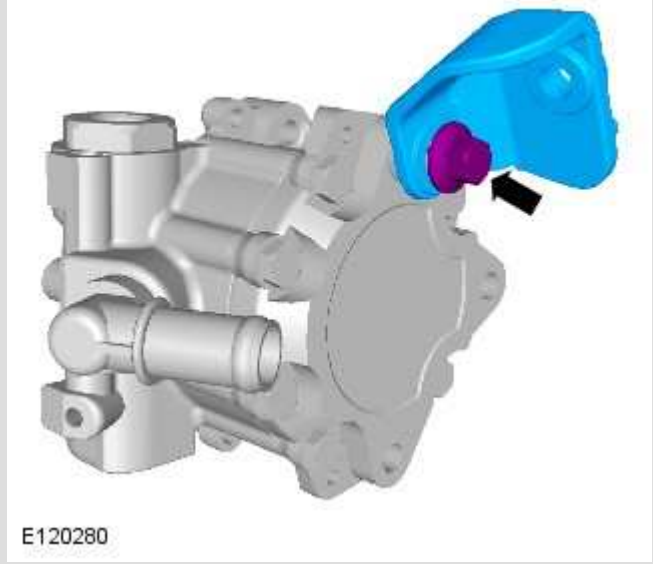
4. Refer to: Accessory Drive Belt (303-05B Accessory Drive - V8 S/C 5.0L Petrol, Removal and Installation).

5. Refer to: Engine Mount LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

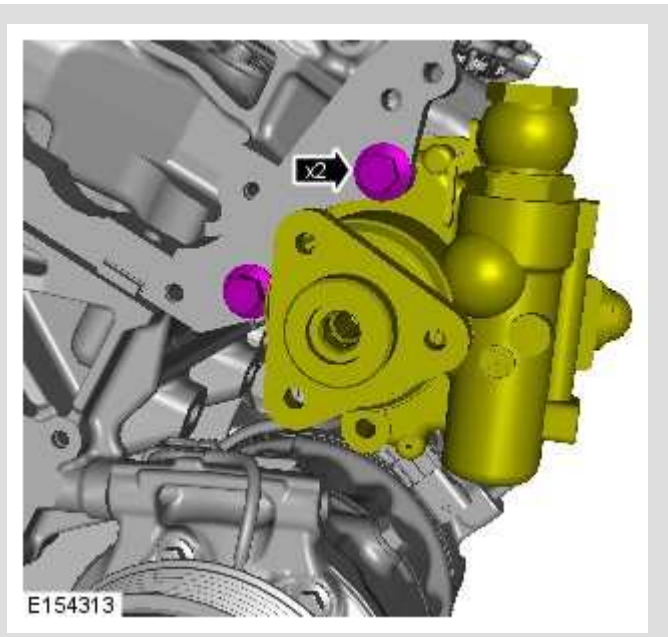
6.

7.

cardiagn.com



8.

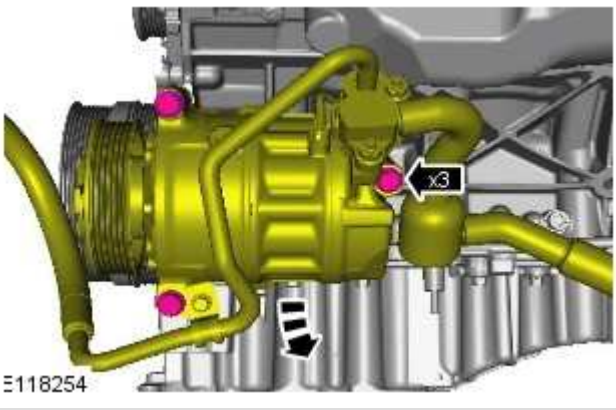


9.

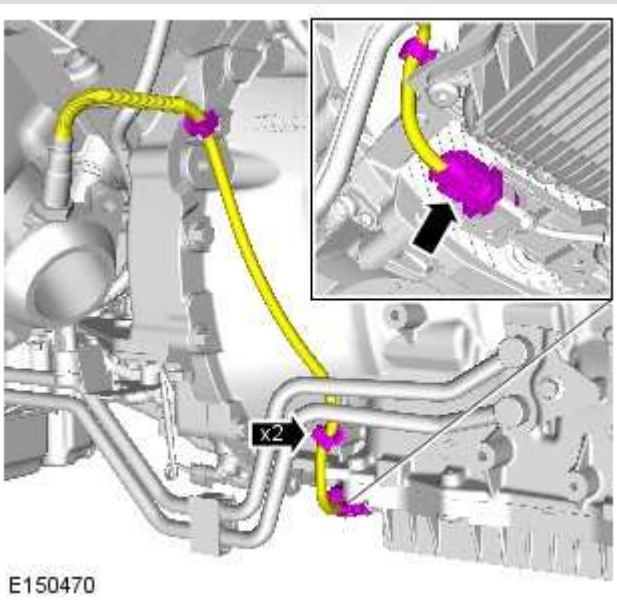
NOTE:

Loosen the bolts, but do not fully remove.

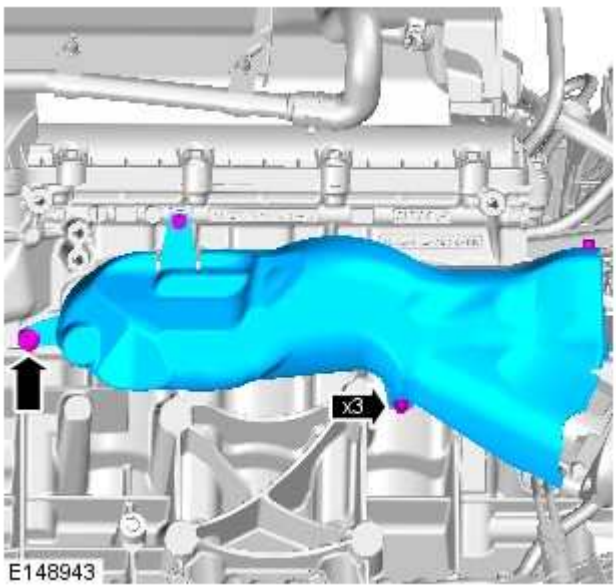
cardiagn.com



10.



11.



cardiagn.com

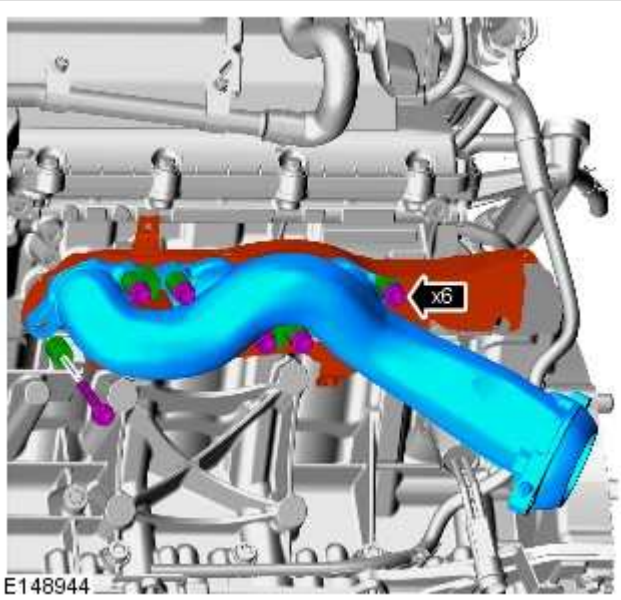
12.

CAUTION:

Discard the bolts.

NOTES:

- Make sure that the position of the spacers is noted before removal of the manifold.
- Remove and discard the gasket.

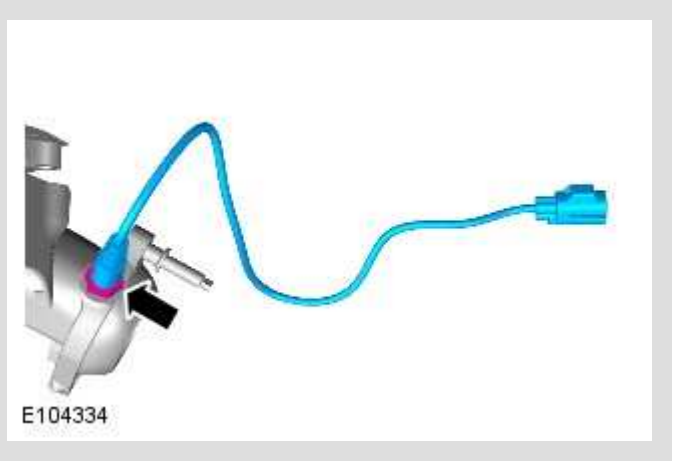


13.

NOTE:

Do not disassemble further if the component is removed for access only.

cardiagn.com



INSTALLATION

1.

CAUTIONS:

- Make sure that the mating faces are clean and free of foreign material.
- Make sure the anti-seize compound does not contact the HO2S tip.

NOTE:

If the original sensor is to be installed, apply lubricant meeting specification ESE-M12A4-A to the thread of the sensor.

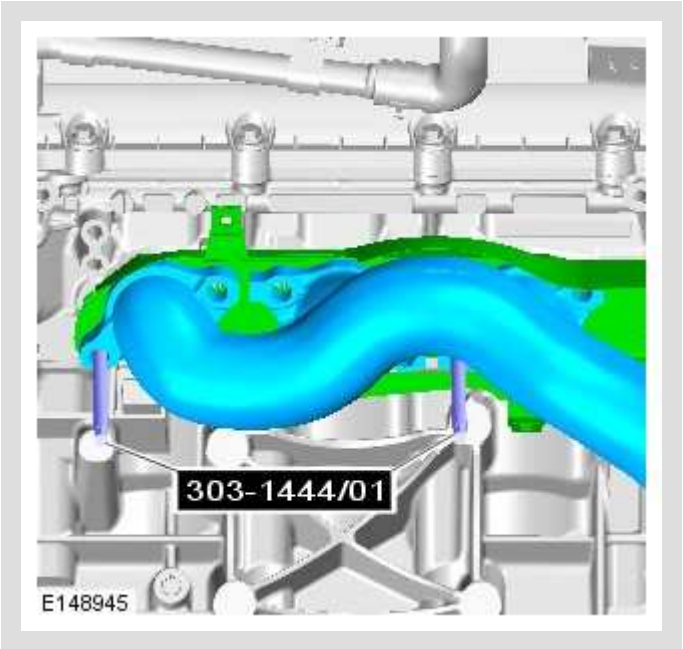
Torque: **45 Nm**

2.

NOTE:

cardiagn.com

Install a new gasket.

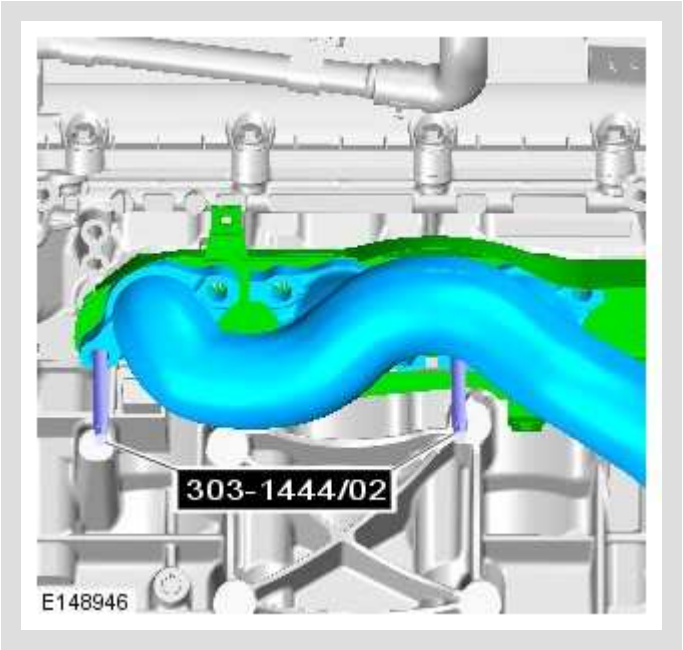


Special Tool(s): 303-1444-01

3.

NOTE:

If a new cylinder head is installed use the special tools in the illustration.



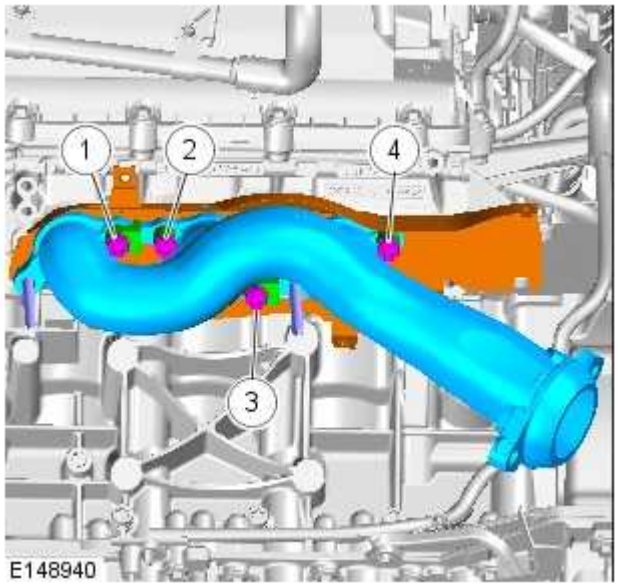
Special Tool(s): 303-1444-02

cardiagn.com

4.

NOTES:

- Make sure that new bolts are installed.
- Install the spacers in the noted position.



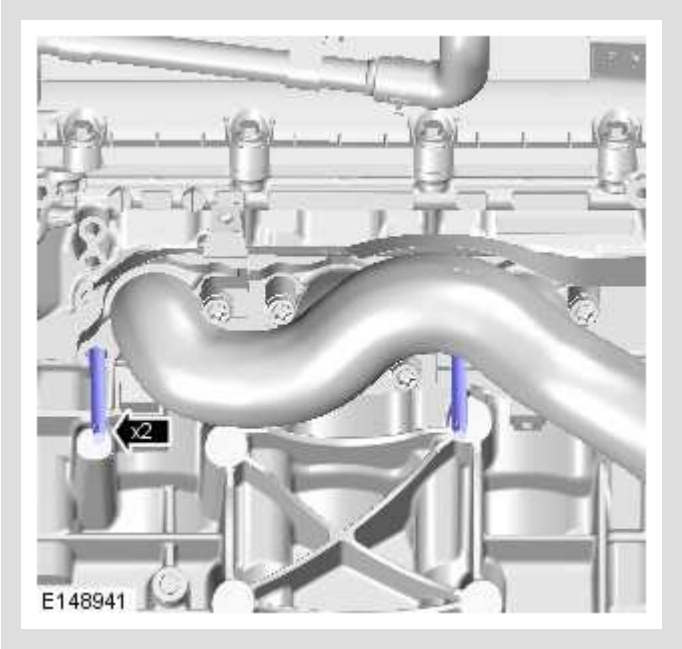
Torque: **10 Nm**

5.

NOTE:

Install the spacers in the noted position.

cardiagn.com



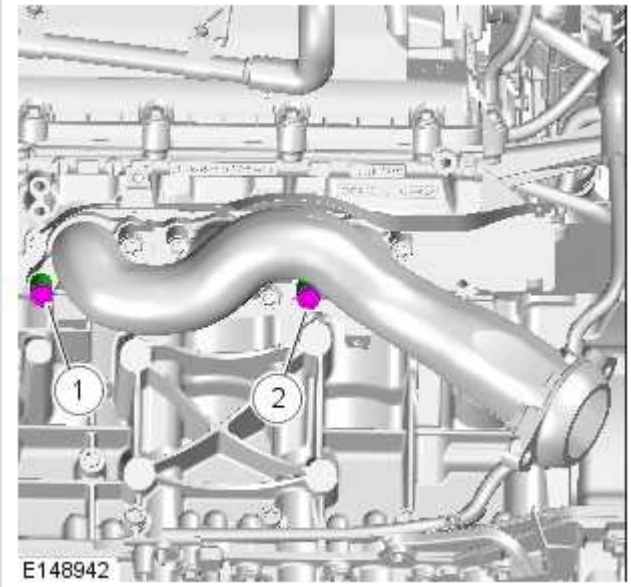
Remove the special tool.

6.

NOTES:

- Make sure that new bolts are installed.
- Install the spacers in the noted position.

cardiagn.com



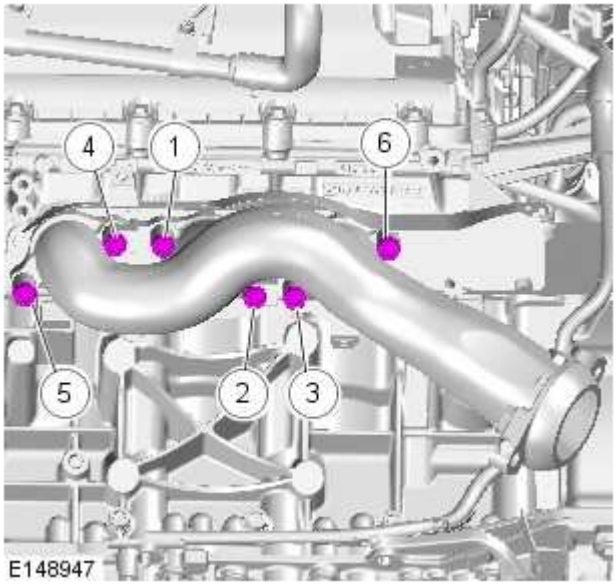
Torque: **10 Nm**

7.

CAUTION:

Tighten the bolts in the sequence shown.

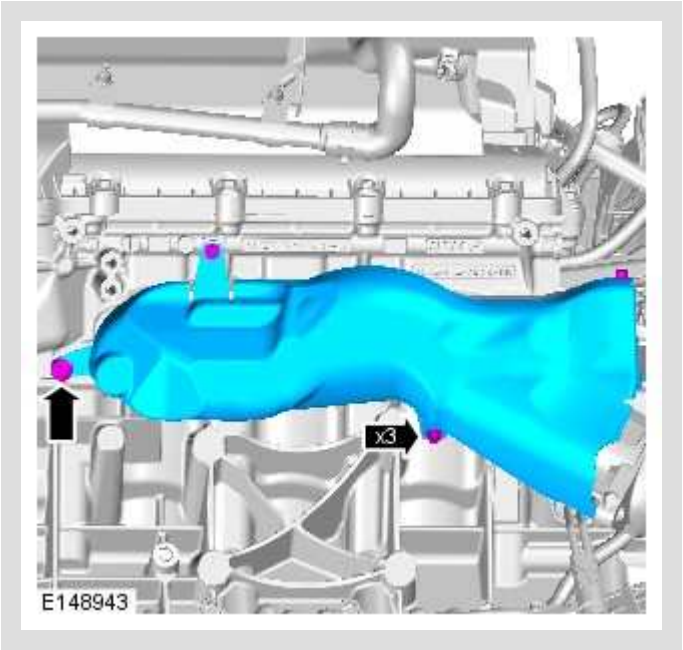
cardiagn.com



Torque: **18 Nm**

8.

cardiagn.com

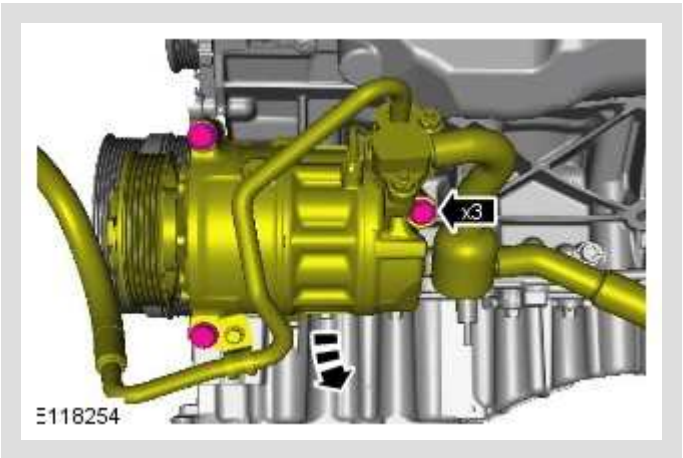


Torque:

Bolt 6.3 x 13 **3 Nm**

M8 **25 Nm**

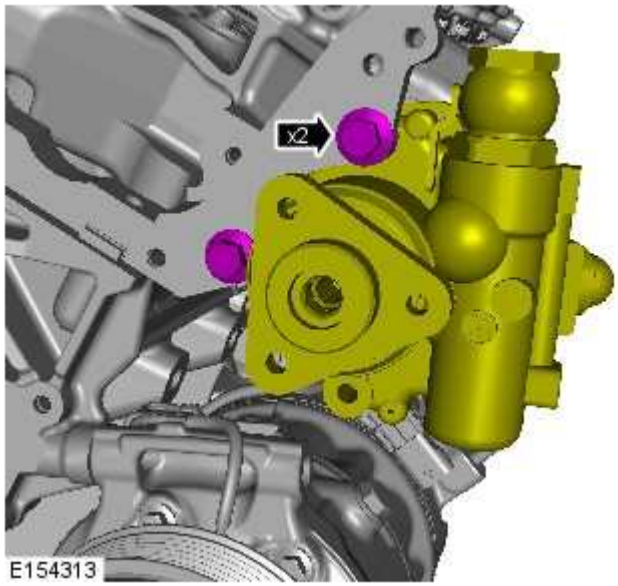
9.



cardiagn.com

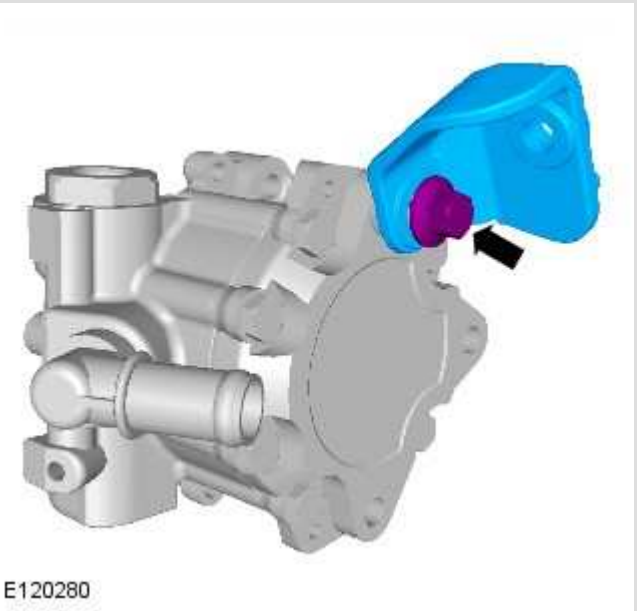
Torque: **25 Nm**

10.



Torque: **25 Nm**

11.



Torque: **25 Nm**

12.

cardiagn.com

Torque: **25 Nm**

13. Refer to: Engine Mount LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

14. Refer to: Accessory Drive Belt (303-05B Accessory Drive - V8 S/C 5.0L Petrol, Removal and Installation).

15. Refer to: Exhaust System (309-00A Exhaust System - V6 S/C 3.0L Petrol, Removal and Installation).

16. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

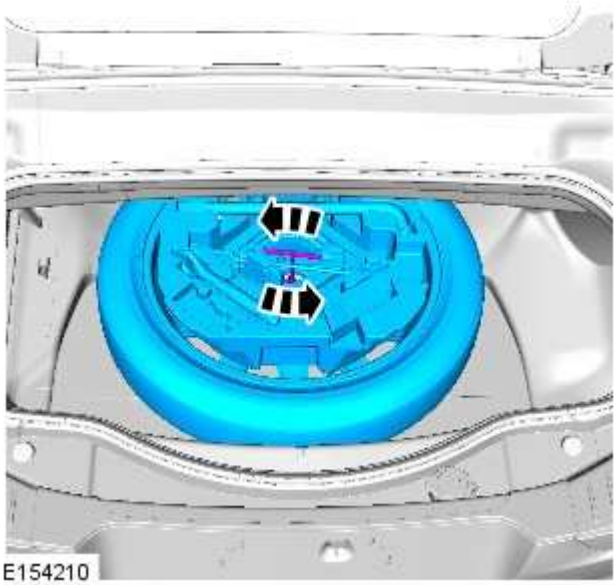
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

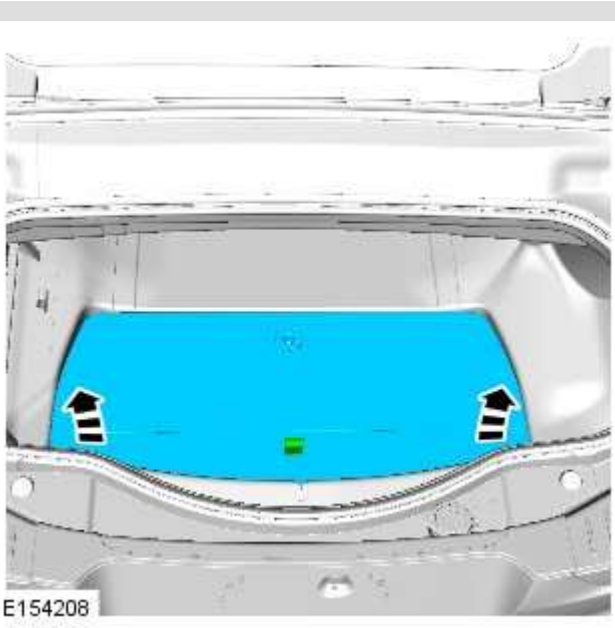
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

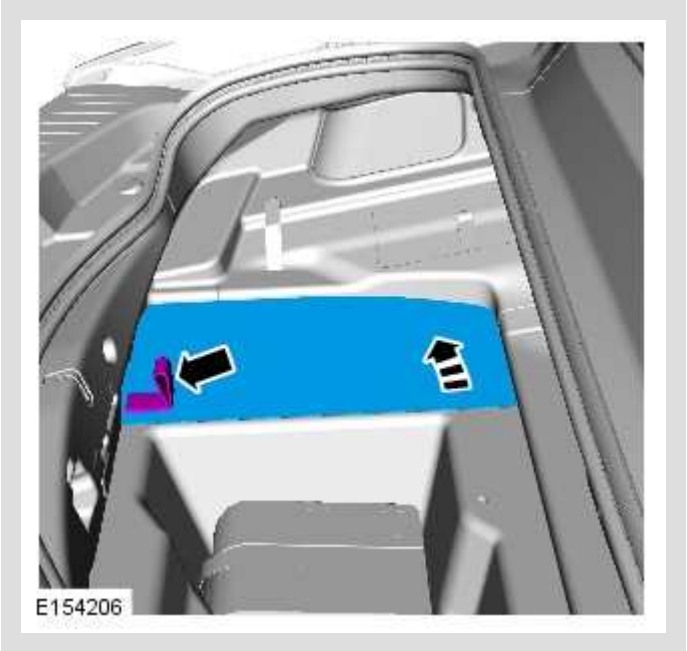


4.



5.

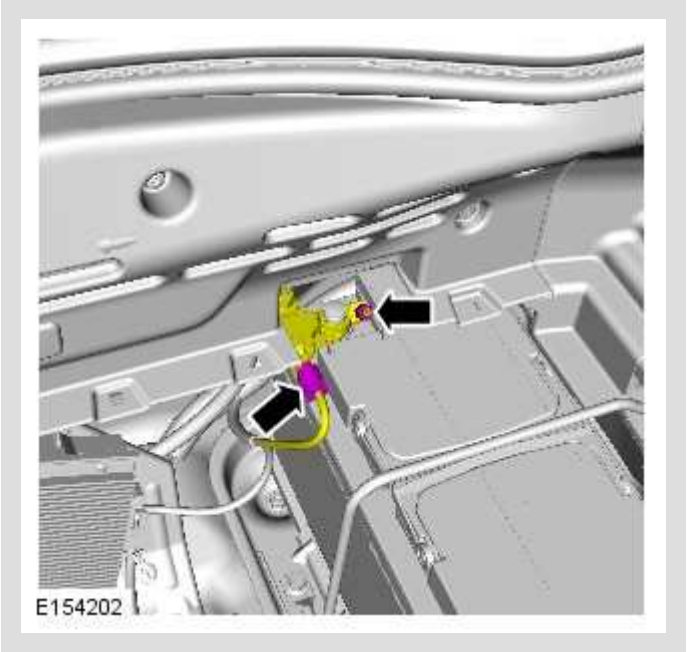
cardiagn.com



6.

CAUTION:

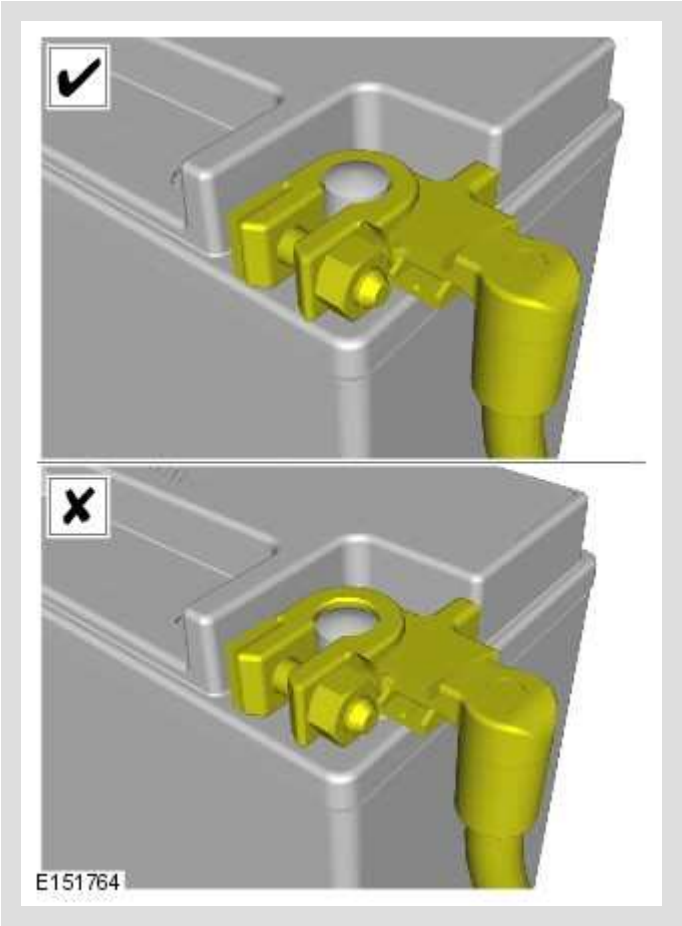
Take extra care not to damage the wiring harnesses.



cardiagn.com

Torque: **6 Nm**

7.



8. To install, reverse the removal procedure.

9.

NOTE:

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

CYLINDER HEAD RH (G1584106)

REMOVAL AND INSTALLATION

12.29.03	CYLINDER HEAD GASKET - RIGHT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	20.3	USED WITHINS	
12.29.12	CYLINDER HEAD - RIGHT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	20.3	USED WITHINS	

SPECIAL TOOL(S)

303-1492

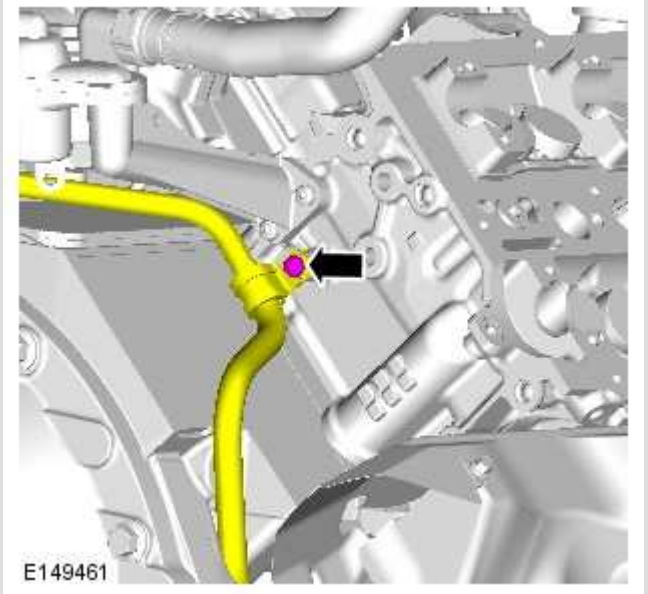
Guide Sleeve, Cylinder Head Bolt

cardiagn.com

REMOVAL

NOTES:

- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

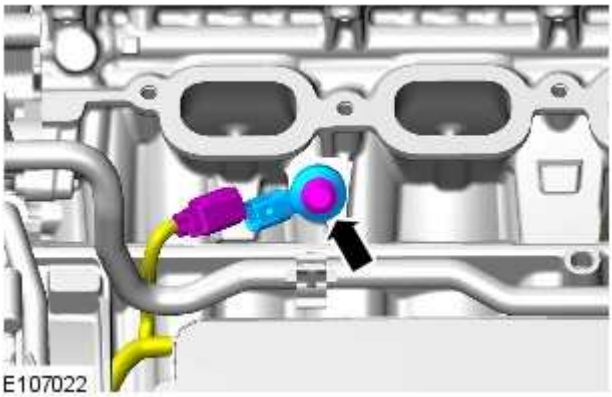
1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
2. Raise and support the vehicle.
3. Refer to: Exhaust Manifold RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
4. Refer to: Camshaft RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
5. 

6.

cardiagn.com

NOTE:

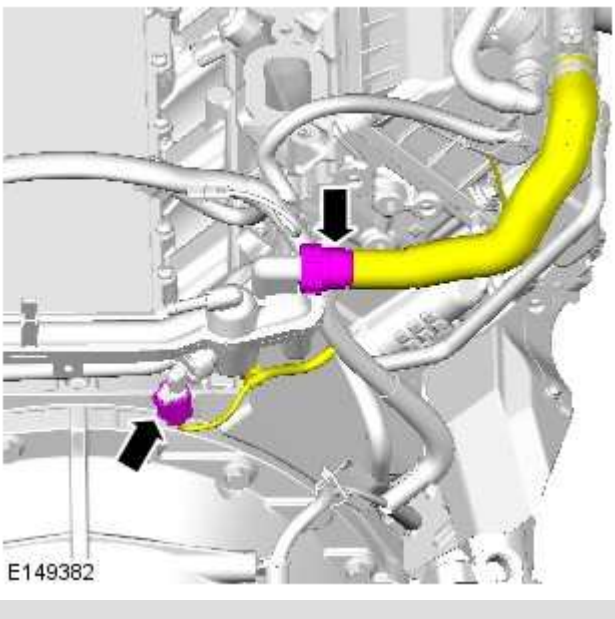
Some variation in the illustrations may occur, but the essential information is always correct.



7.

NOTE:

Clamp the hose to minimize coolant loss.



8.

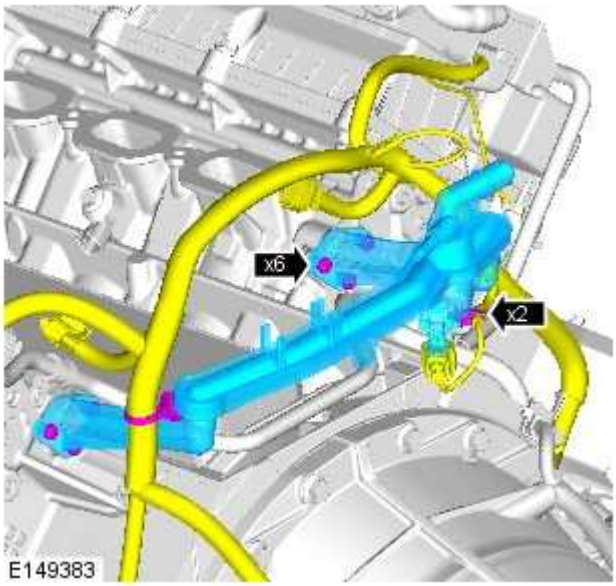
cardiagn.com

CAUTION:

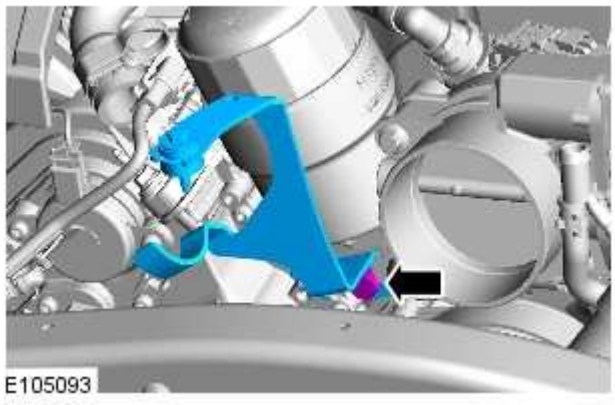
Discard the seals.

NOTE:

Be prepared to collect escaping coolant.



9.

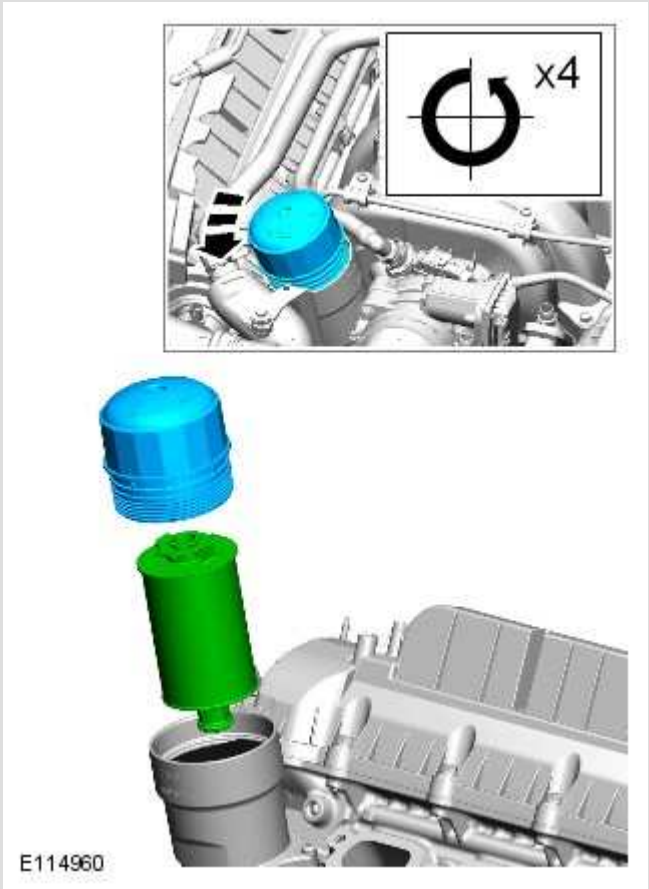


10.

cardiagn.com

NOTE:

Remove and discard the O-ring seal.

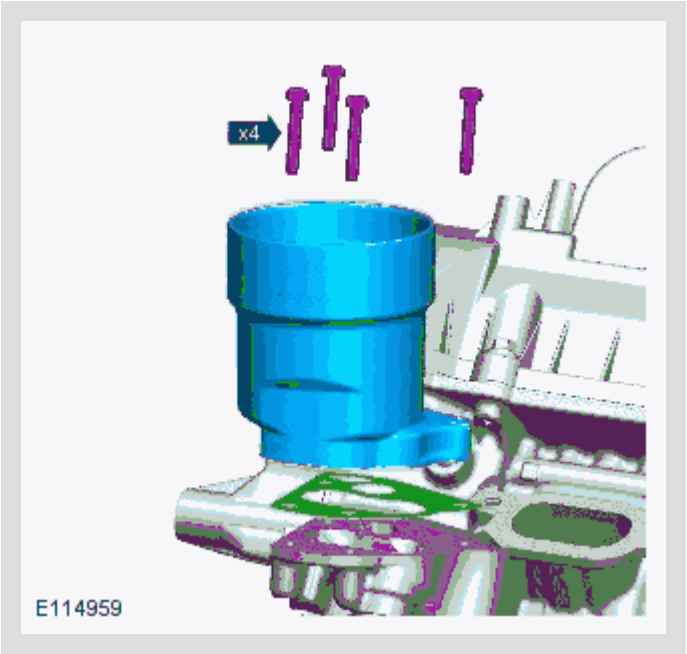


11.

NOTE:

Discard the gasket.

cardiagn.com



12.

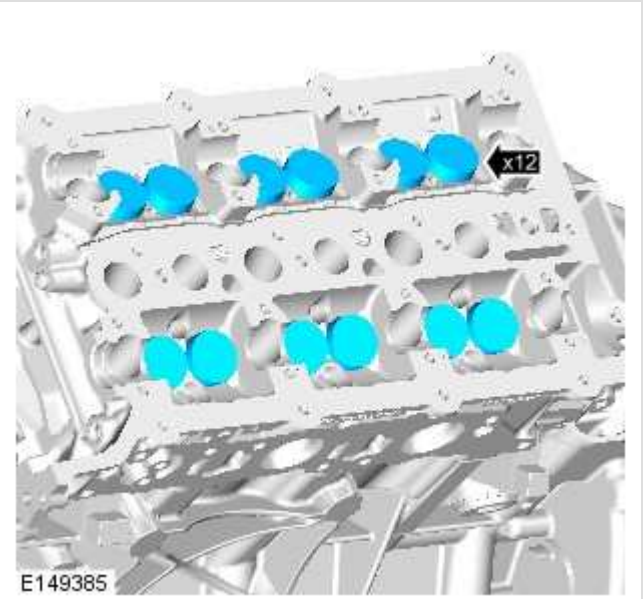
CAUTIONS:

- If a new cylinder head has been installed then new tappets must be installed.
- If the cylinder head is being removed without a new component being installed, the tappets must be installed in their original positions.

NOTE:

Left-hand shown, right-hand similar.

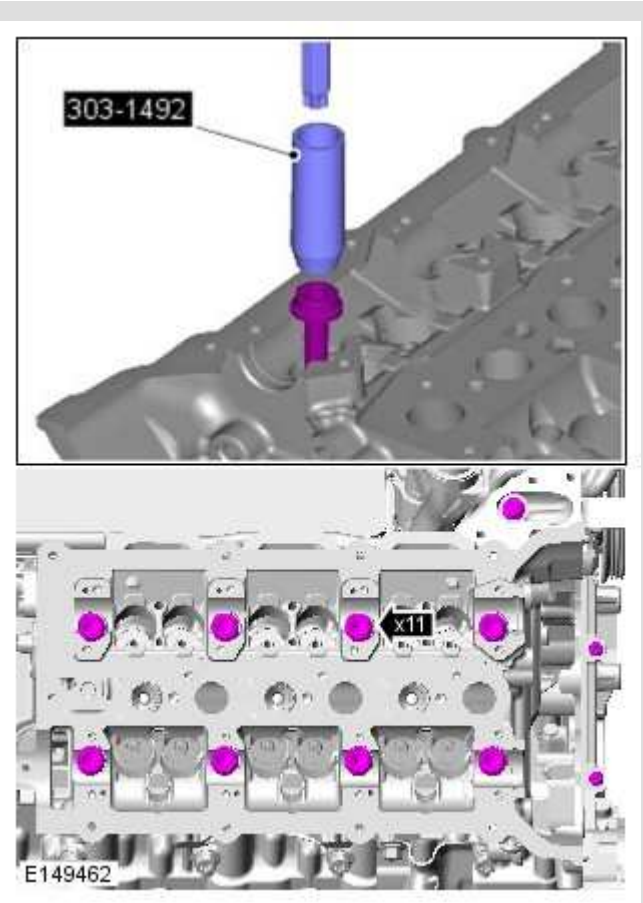
cardiagn.com



13.

CAUTION:

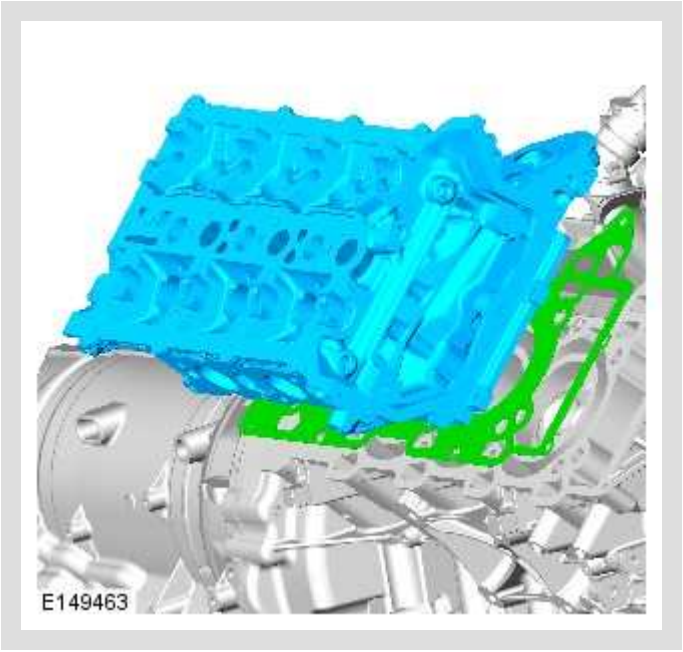
Discard the bolts.



Special Tool(s): 303-1492

cardiagn.com

14.



INSTALLATION

1.

CAUTION:

An acceptable flatness of the cylinder head is 0.1mm.

Check cylinder head face for distortion, across the center and from corner to corner.

2.

WARNING:

Make sure care is taken when handling the cylinder head gasket.

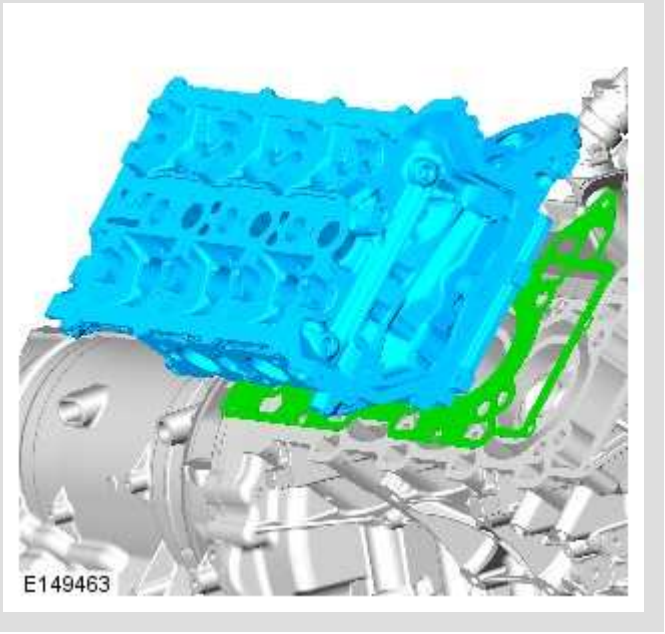
cardiagn.com

CAUTIONS:

- The head gasket must be installed over the cylinder block dowels.
- Make sure that the mating faces are clean and free of foreign material.

NOTE:

Install a new cylinder head gasket.



3.

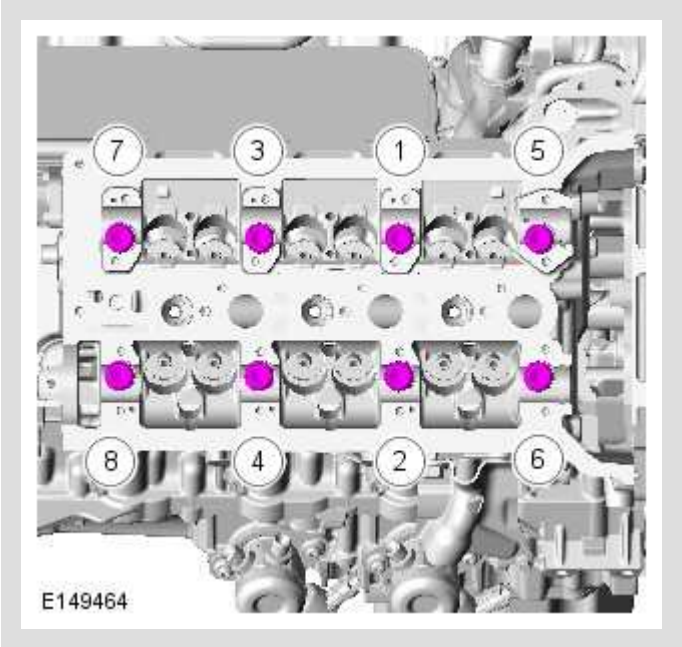
CAUTION:

Make sure that new cylinder head bolts are installed.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com

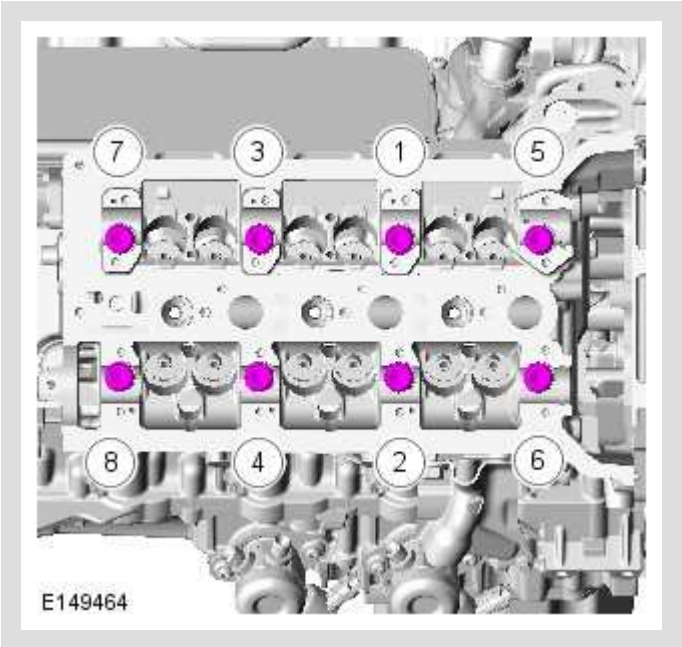


Torque: **20 Nm**

4.

NOTE:

Tighten the bolts in the indicated sequence.



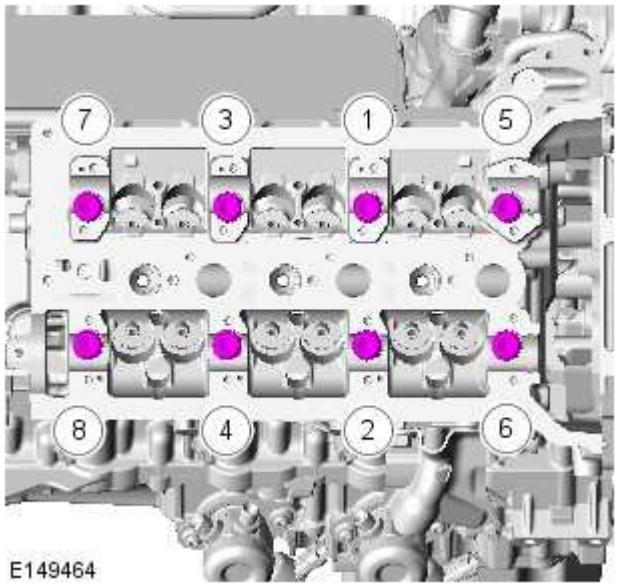
Torque: **35 Nm**

5.

cardiagn.com

NOTE:

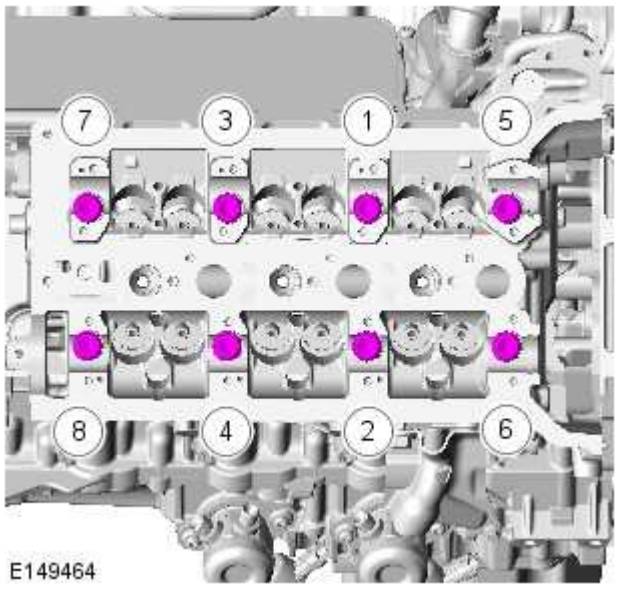
Slacken the bolts in the sequence shown.



6.

NOTE:

Tighten the bolts in the indicated sequence.



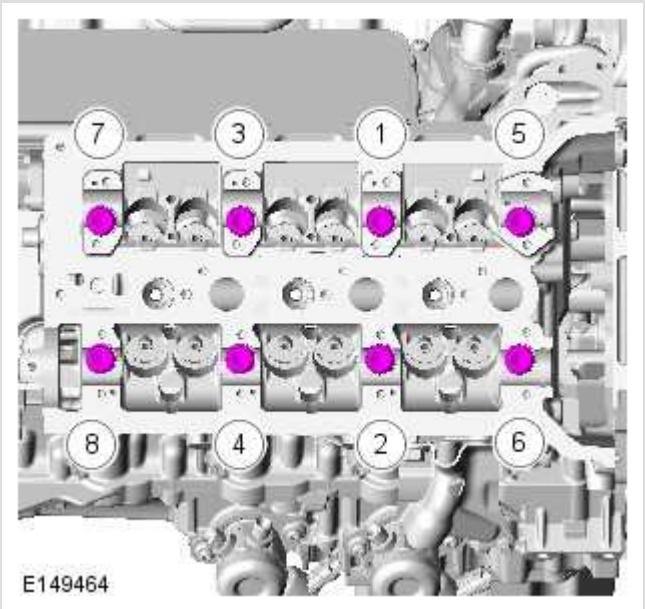
Torque: **35 Nm**

cardiagn.com

7.

NOTE:

Tighten the bolts in the indicated sequence.



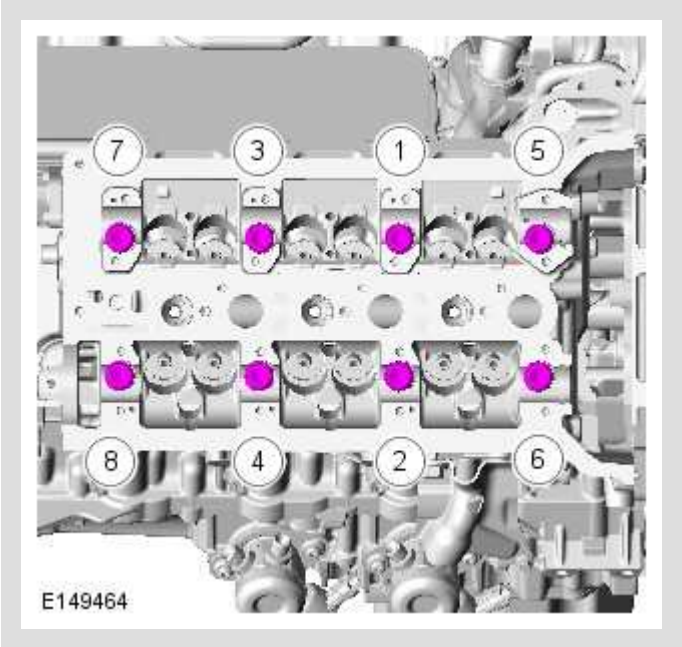
Tighten the bolts 1 to 8, a further 90 degrees.

8.

NOTE:

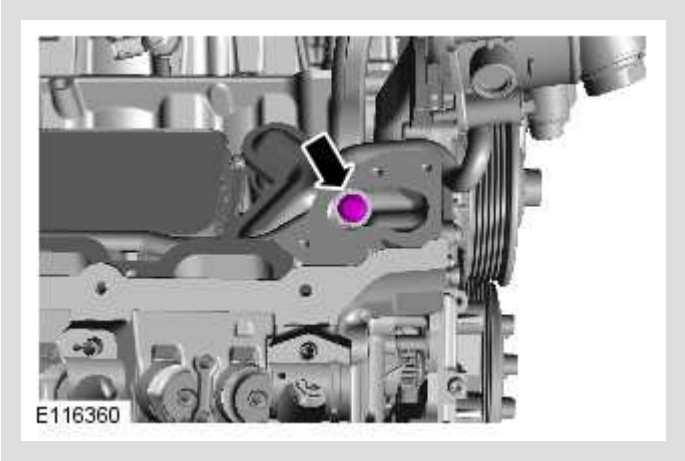
Tighten the bolts in the indicated sequence.

cardiagn.com



Tighten the bolts 1 to 8, a further 120 degrees.

9.



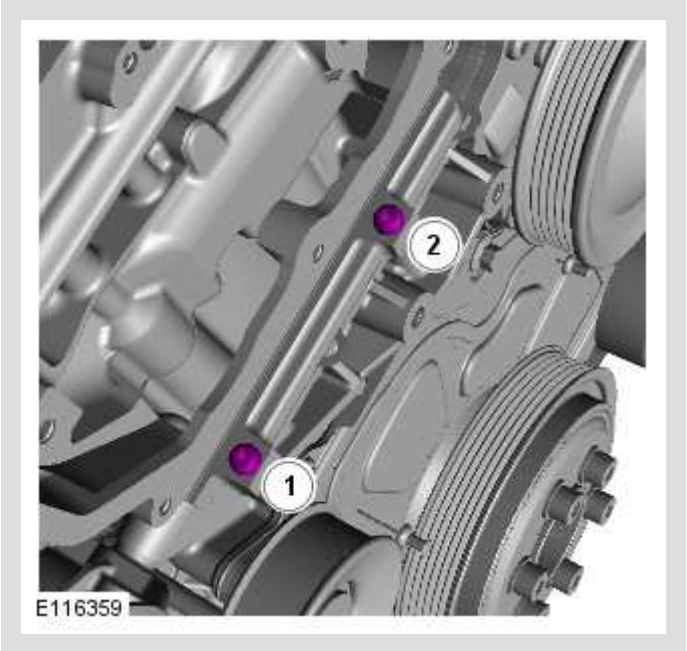
Torque: **25 Nm**

10.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com



Torque: **12 Nm**

11.

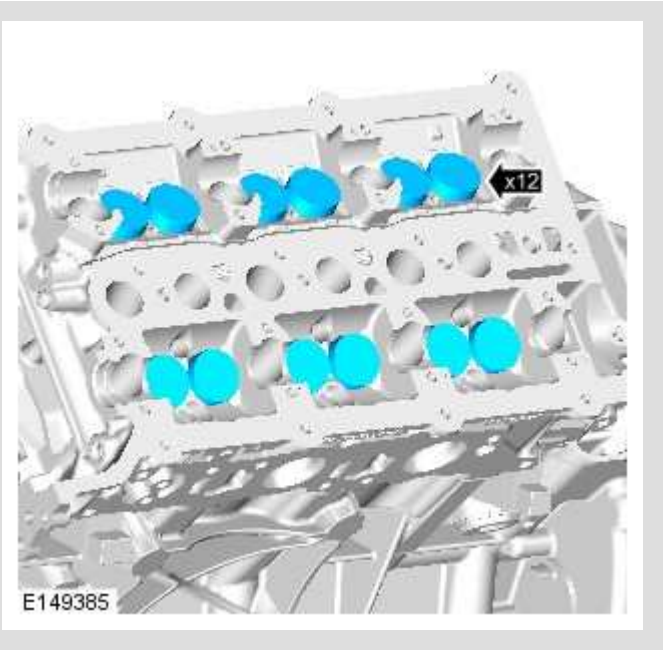
CAUTIONS:

- If a new cylinder head has been installed then new tappets must be installed.
- If the cylinder head is being removed without a new component being installed, the tappets must be installed in their original positions.

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Left-hand shown, right-hand similar.

cardiagn.com

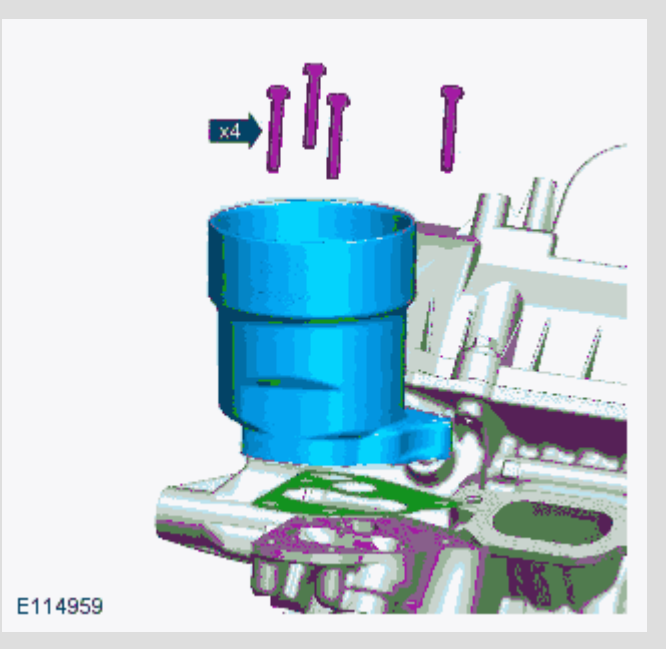


Lubricate the valve tappets with clean engine oil.

12.

NOTE:

Install a new gasket.



Torque: **12 Nm**

13.

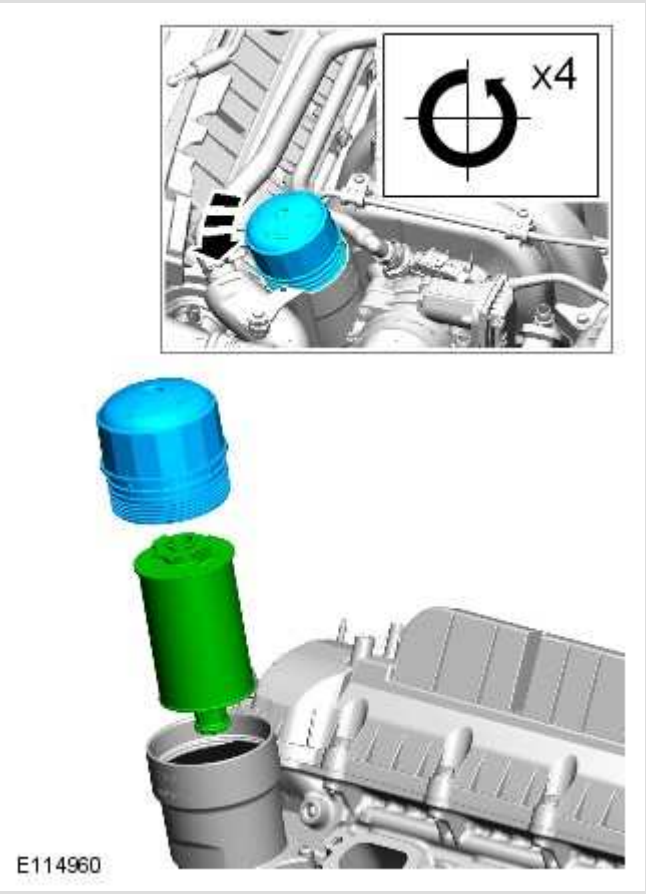
CAUTION:

cardiagn.com

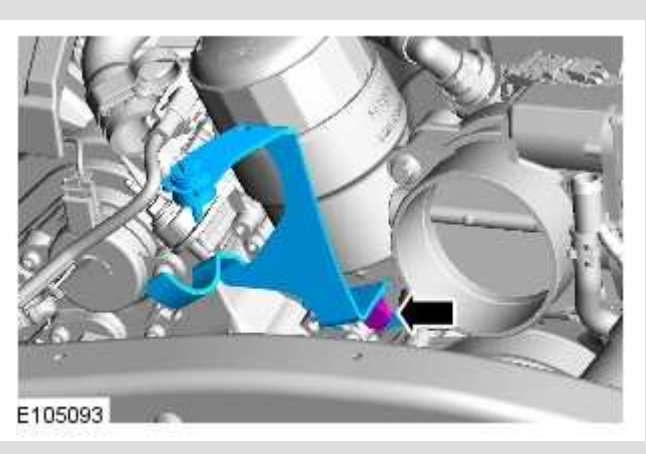
A new O-ring seal is to be installed.

NOTE:

Install a new engine oil filter.



14.

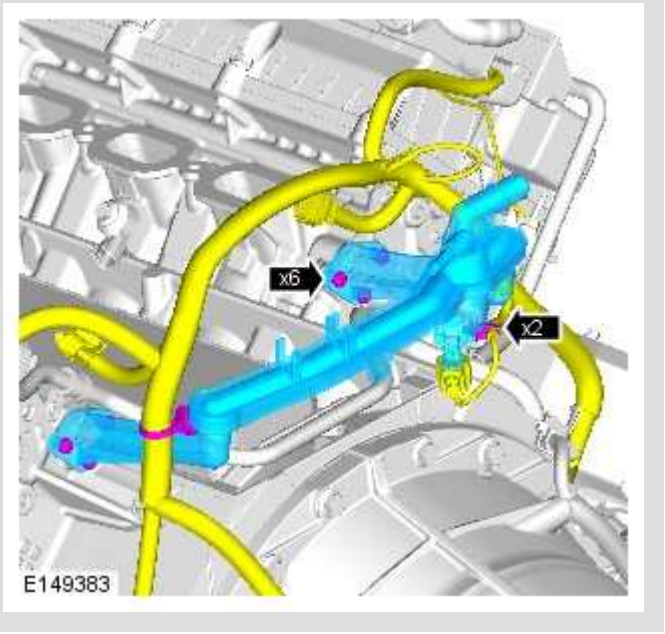


Torque: **10 Nm**

cardiagn.com

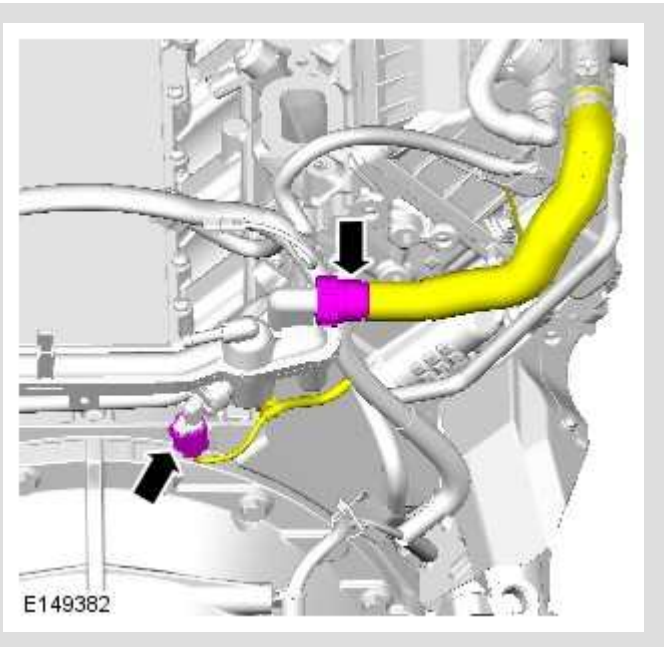
15. **CAUTION:**

Install the new seals.



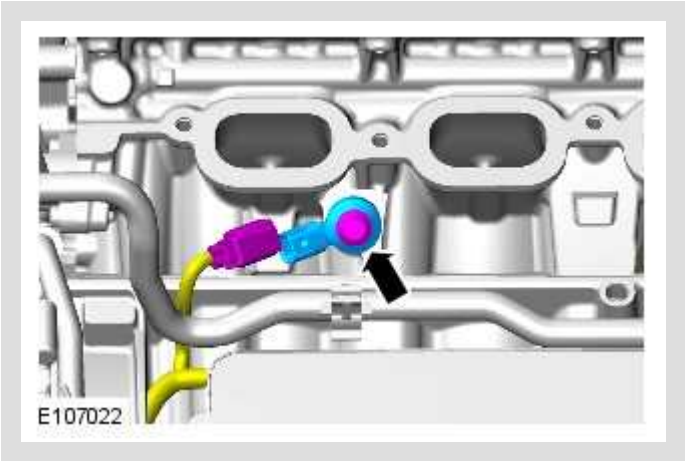
Torque: **10 Nm**

16.



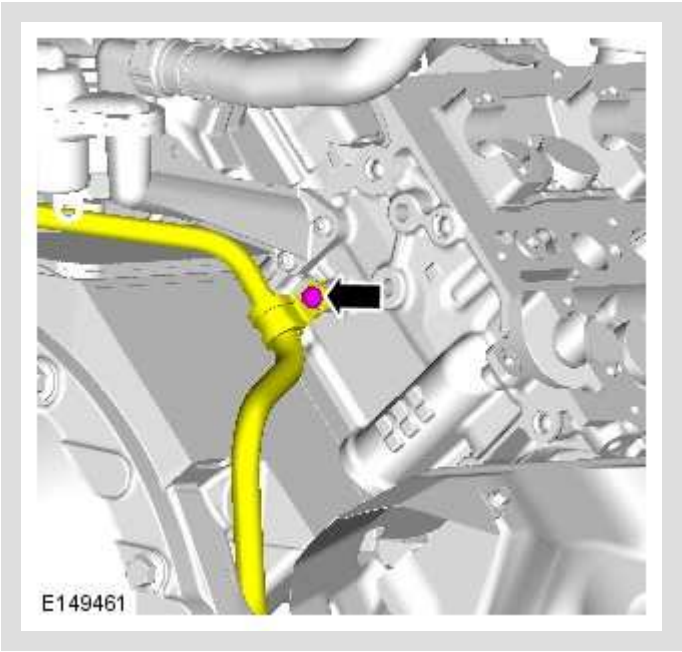
17.

cardiagn.com



Torque: **20 Nm**

18.



Torque: **10 Nm**

19. Refer to: Camshaft RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

20. Refer to: Exhaust Manifold RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

21.

cardiagn.com

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

EXHAUST MANIFOLD RH (G1584110)

REMOVAL AND INSTALLATION

30.15.56	EXHAUST MANIFOLD RIGHT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	2.8	USED WITHINS	

SPECIAL TOOL(S)

303-1444-01

Exhaust Manifold Installation Guide Pins - Threaded

cardiagn.com

	303-1444-02 Exhaust Manifold Installation Guide Pins - Unthreaded

REMOVAL

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

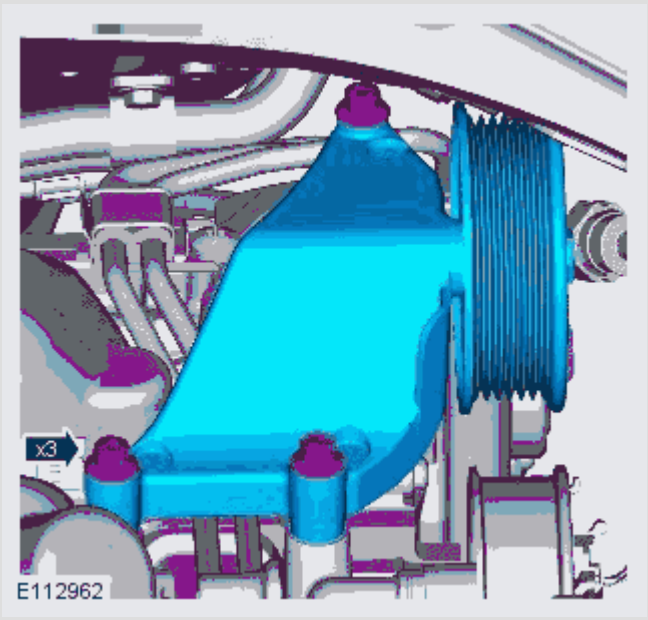
cardiagn.com

3. Refer to: Exhaust System (309-00A Exhaust System - V6 S/C 3.0L Petrol, Removal and Installation).

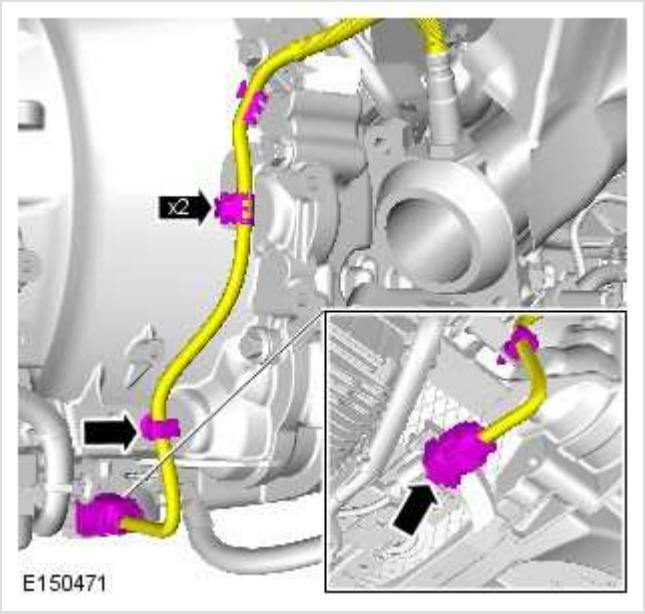
4. Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

5. Refer to: Engine Mount RH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

6.

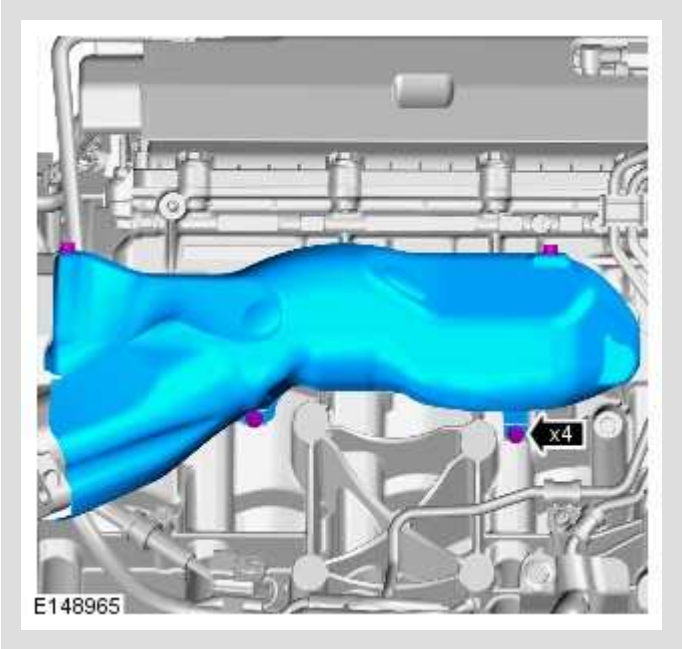


7.



8.

cardiagn.com



9.

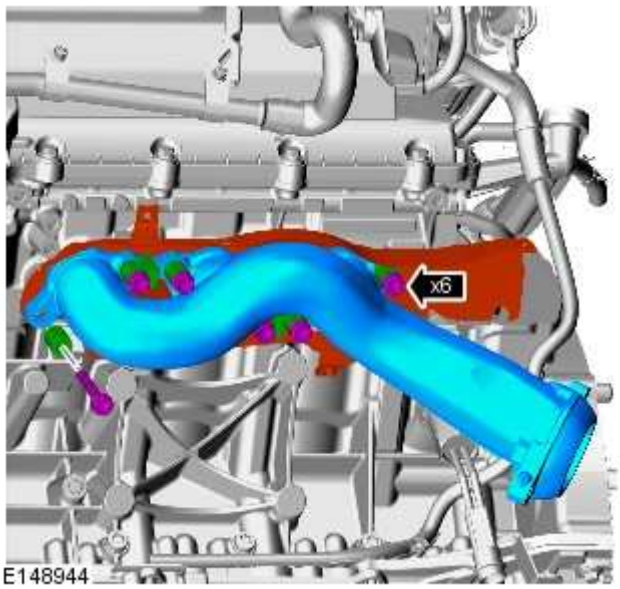
CAUTIONS:

- Discard the bolts.
- LH illustration shown, RH is similar.

NOTES:

- Discard the gasket.
- Make sure that the position of the spacers is noted before removal of the manifold.

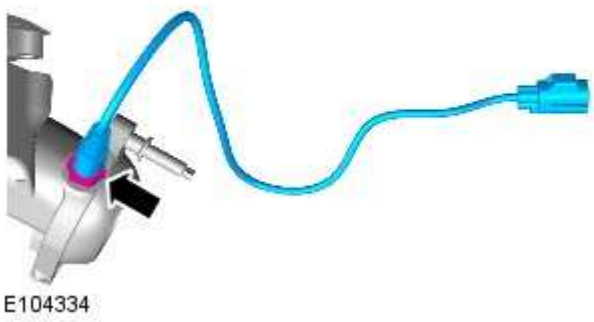
cardiagn.com



10.

NOTE:

Do not disassemble further if the component is removed for access only.



cardiagn.com

INSTALLATION

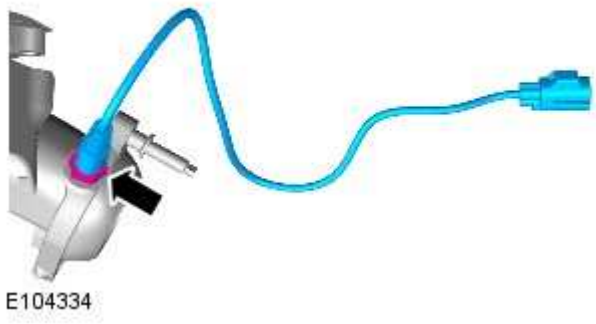
1.

CAUTIONS:

- Make sure that the mating faces are clean and free of foreign material.
- Make sure the anti-seize compound does not contact the HO2S tip.

NOTE:

If the original sensor is to be installed, apply lubricant meeting specification ESE-M12A4-A to the thread of the sensor.



Torque: **45 Nm**

2.

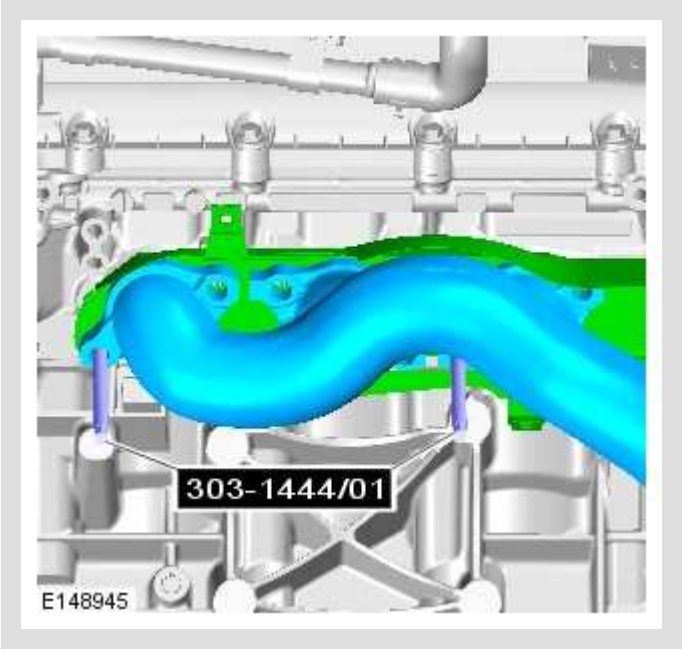
CAUTION:

LH illustration shown, RH is similar.

NOTE:

cardiagn.com

Install a new gasket.



Special Tool(s): 303-1444-01

3.

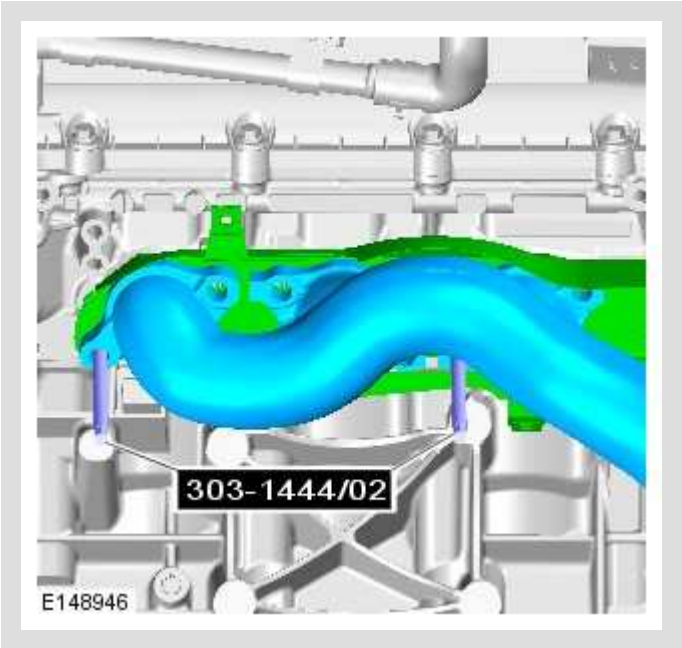
CAUTION:

LH illustration shown, RH is similar.

NOTE:

If a new cylinder head is installed use the special tools in the illustration.

cardiagn.com



Special Tool(s): 303-1444-02

4.

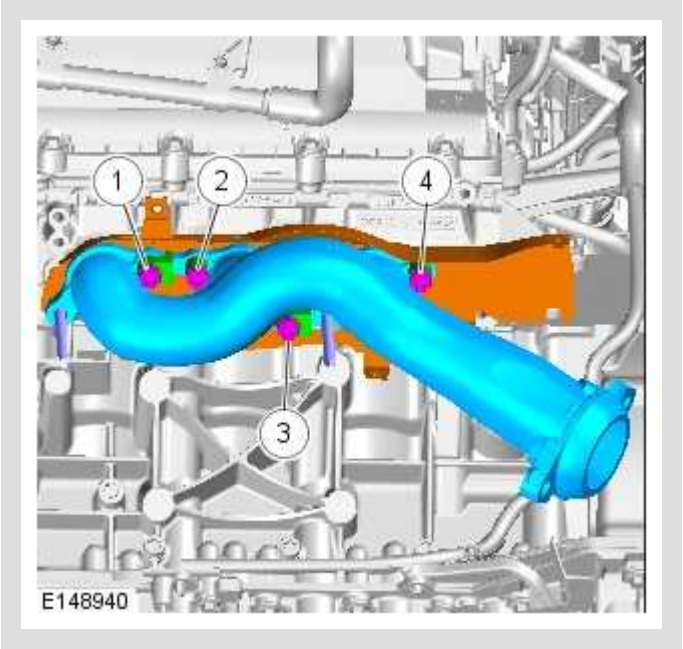
CAUTIONS:

- Make sure that new bolts are installed.
- LH illustration shown, RH is similar.

NOTE:

Install the spacers in the noted position.

cardiagn.com

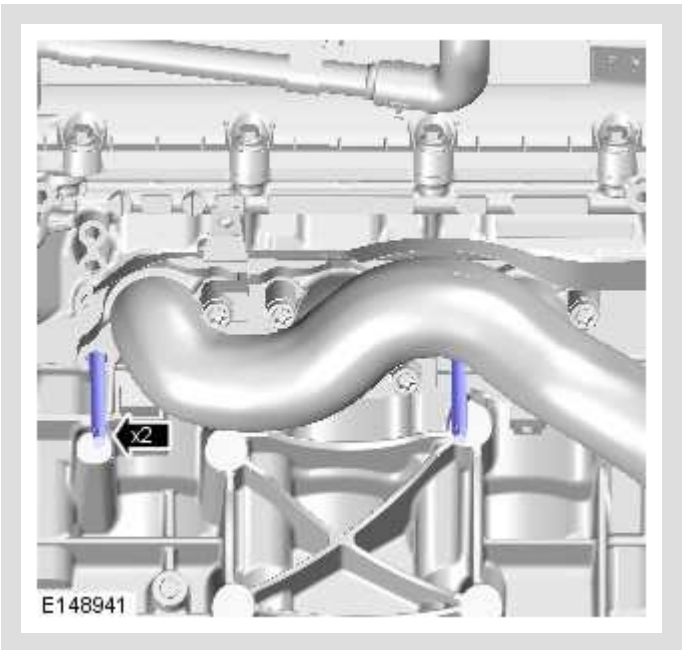


Torque: **10 Nm**

5.

CAUTION:

LH illustration shown, RH is similar.



Remove the special tool.

cardiagn.com

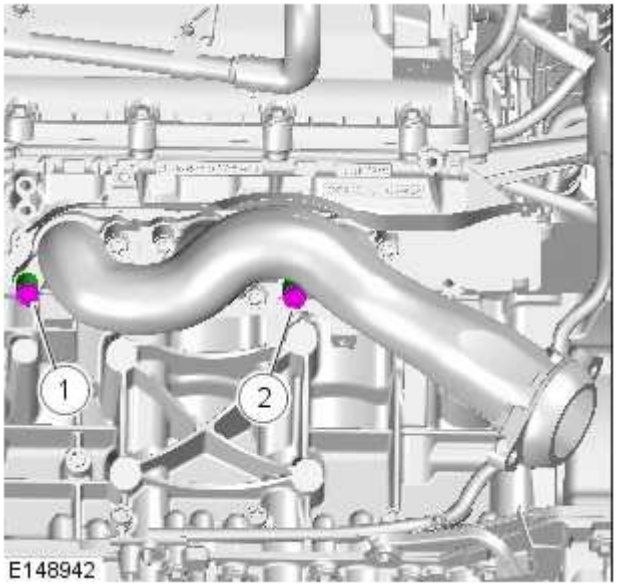
6.

CAUTIONS:

- Make sure that new bolts are installed.
- LH illustration shown, RH is similar.

NOTE:

Install the spacers in the noted position.



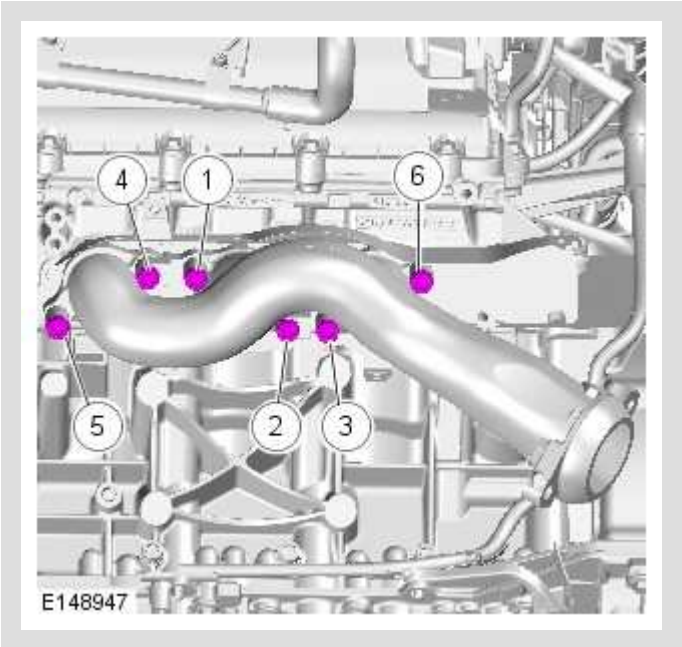
Torque: **10 Nm**

7.

CAUTIONS:

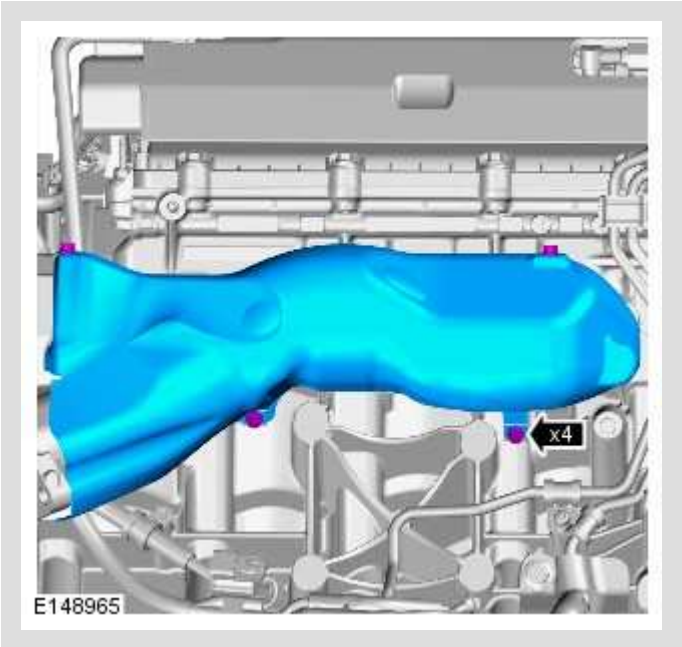
- LH illustration shown, RH is similar.
- Tighten the bolts in the sequence shown.

cardiagn.com



Torque: **18 Nm**

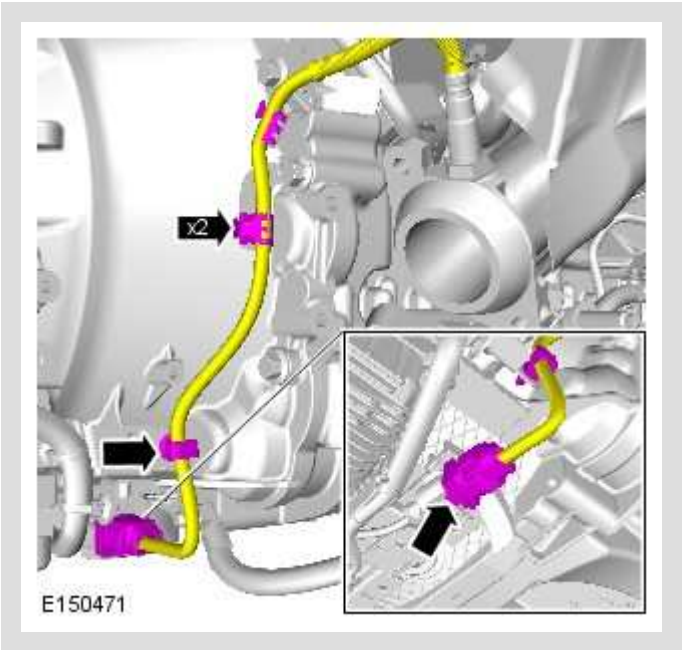
8.



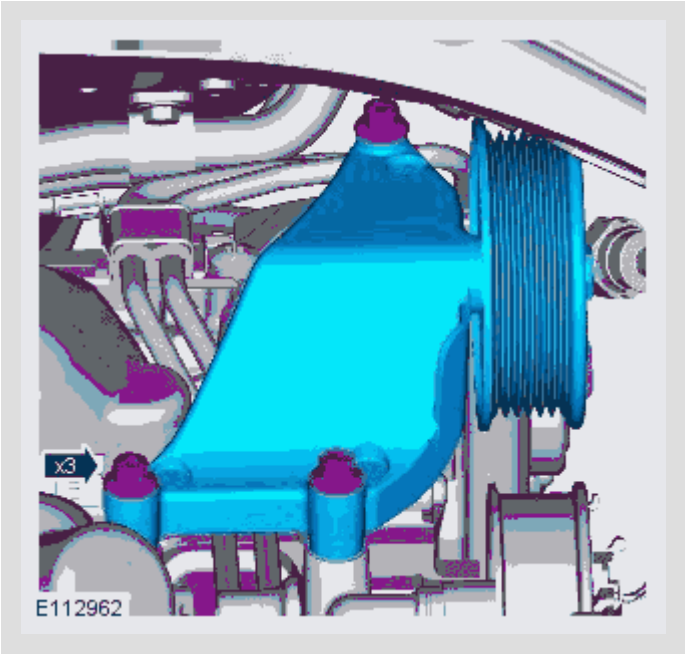
Torque: **3 Nm**

9.

cardiagn.com



10.



Torque: **25 Nm**

11. Refer to: Engine Mount RH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

12. Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

cardiagn.com

13. Refer to: Exhaust System (309-00A Exhaust System - V6 S/C 3.0L Petrol, Removal and Installation).

14. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

CAMSHAFT RH (G1584101)

REMOVAL AND INSTALLATION

12.13.18	CAMSHAFT - BANK 1 SET - RENEW	3000 CC, AJ V6 (AJ126)	17.8	USED WITHINS	

REMOVAL

CAUTION:

Make sure that the orientation and code on the top of the camshaft bearing caps is noted (along with the bank - A or B), so that on installation the components are installed to their original position. Failure to follow this instruction may cause damage to the vehicle.

cardiagn.com

NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

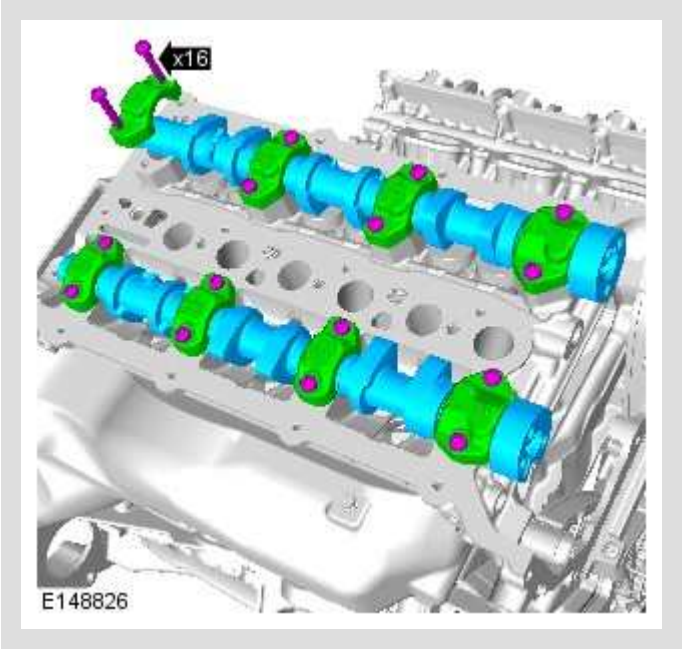
4. **CAUTIONS:**

   - Rotate the camshafts until all the valves are at their minimum open point.
   - Evenly and progressively, release the camshaft bearing caps.

   NOTE:

   Remove the camshaft bearing caps. Note: their position, orientation and markings. Each is marked with its position (number) and an orientation (arrow).

cardiagn.com



INSTALLATION

1.

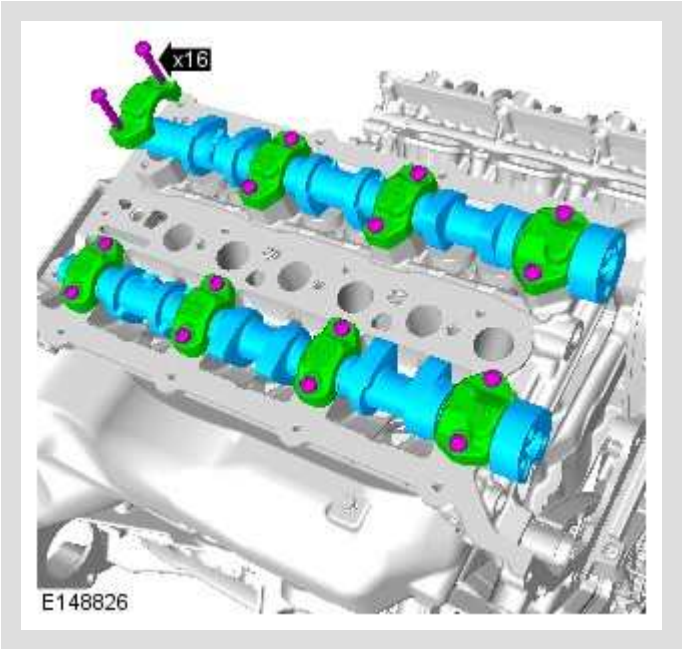
CAUTIONS:

- Prior to installing the camshafts, position the crankshaft 45 degrees ATDC cylinder 1A to prevent valve/piston collision.
- Evenly and progressively install and tighten the camshaft bearing caps.
- Make sure that the camshafts and camshaft bearing caps are installed in their original locations.

NOTE:

Lubricate the camshafts and the camshaft bearing caps with EP90 oil (or 75/90 viscosity oil will suffice) prior to installation.

cardiagn.com

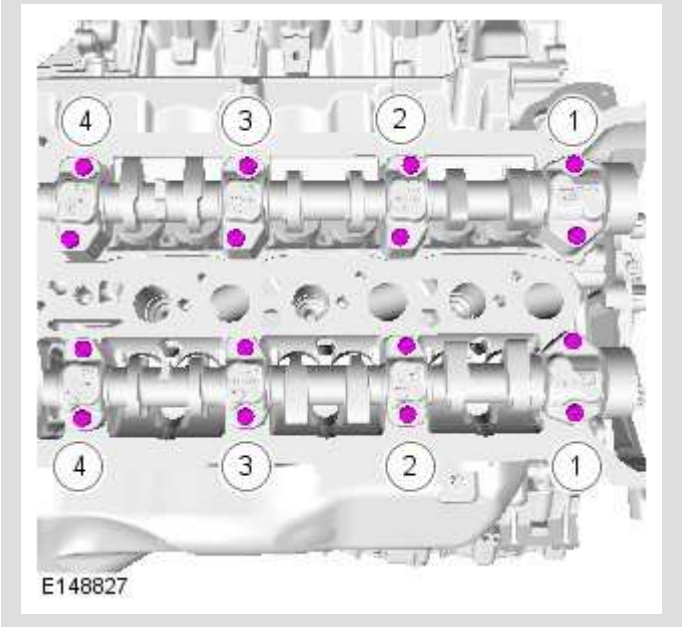


Torque: **3 Nm**

2.

NOTE:

Tighten the bolts in the indicated sequence.



Torque: **12 Nm**

3.

CAUTION:

cardiagn.com

Only rotate the crankshaft clockwise.

Rotate the crankshaft until the camshaft lobe on the valve being checked is 180 degrees from the maximum opening position.

4. **NOTE:**

If the valve clearance is incorrect, continue to the next step. If the valve clearance is correct, continue to step 8.

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

5. **CAUTIONS:**

- Use the following formula to calculate the required bucket thickness. Original thickness + measured clearance - desired clearance = required bucket thickness.
- Do not use a magnet to remove the tappet.

Remove the tappet and measure the thickness.

6. **NOTE:**

If a new tappet is installed then go back to step 1 of the install procedure.

Install a new tappet if required.

cardiagn.com

7. Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

8. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

9. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

△ NOTES:

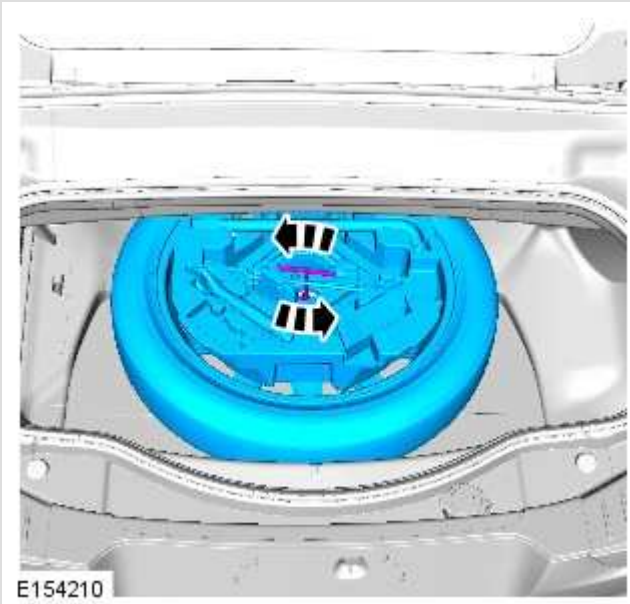
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.

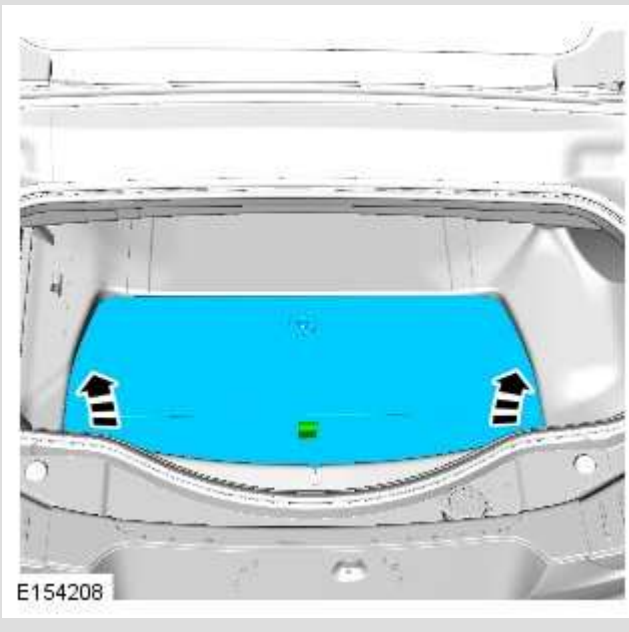
cardiagn.com

- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

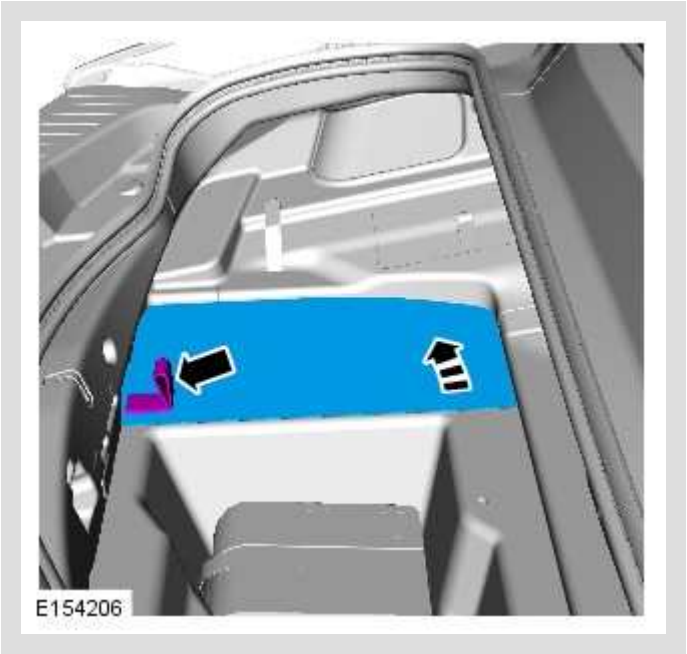
2. Obtain and record the audio unit preset radio frequencies.

3. 

4. 

cardiagn.com

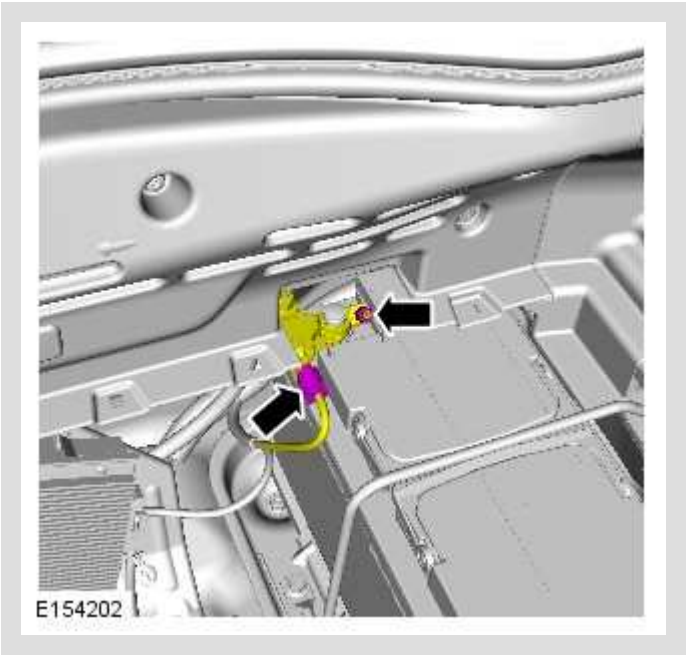
5.



6.

CAUTION:

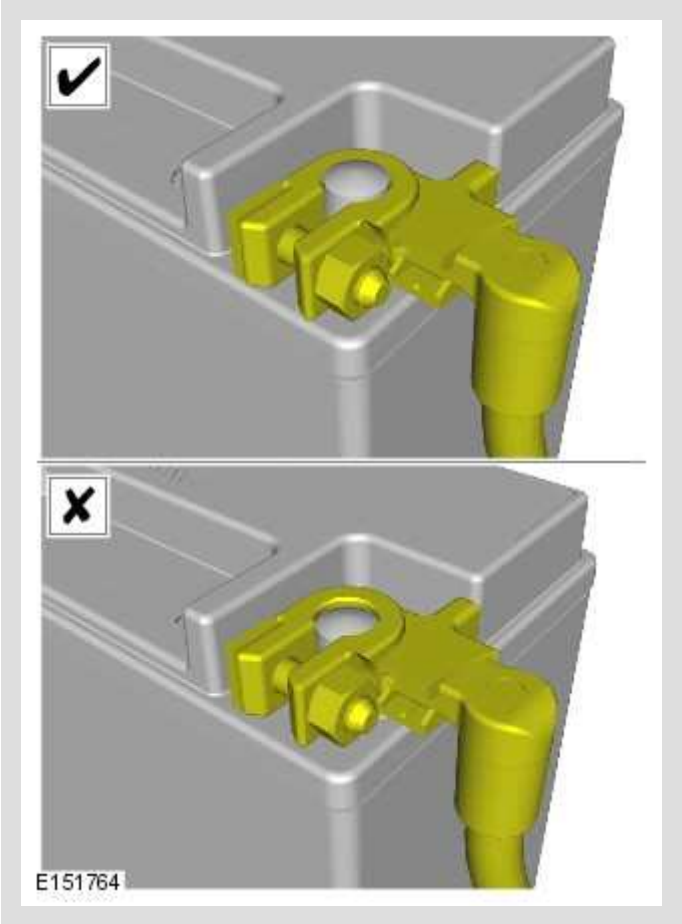
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

cardiagn.com

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

ELECTRIC OIL PUMP (G1774732)

REMOVAL AND INSTALLATION

12.60.26	OIL PUMP - RENEW	3000 CC, AJ V6 (AJ126)	13.9	USED WITHINS

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

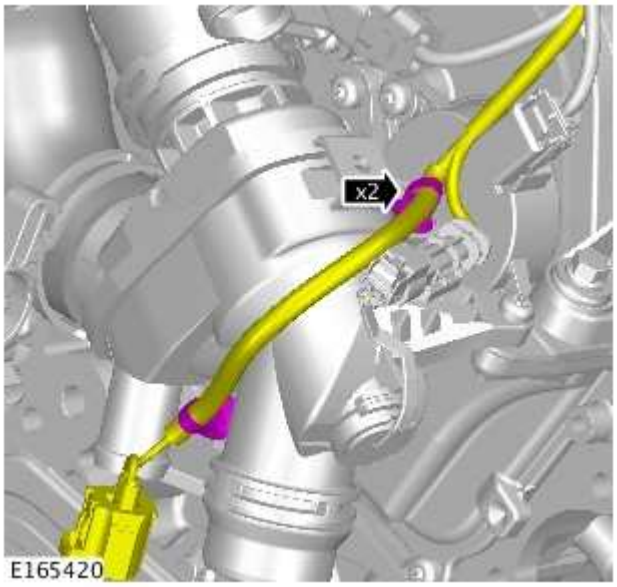
   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

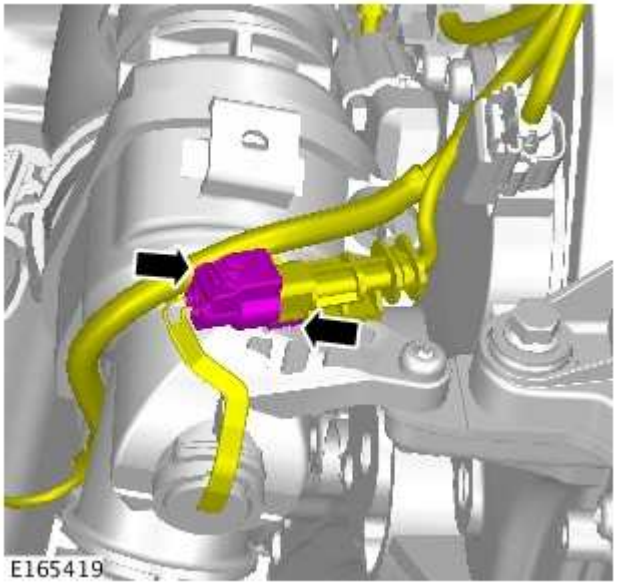
3. Refer to: Oil Pan Extension (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Oil Pan (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

cardiagn.com

4.

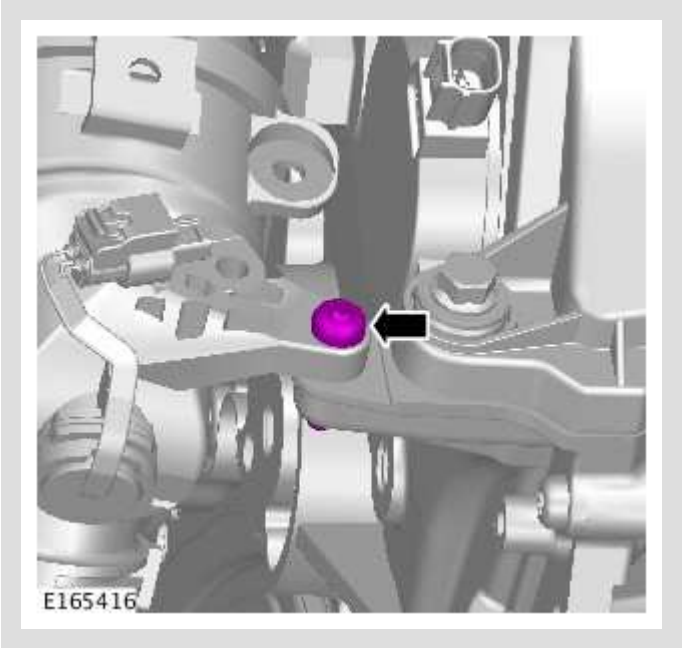


5.

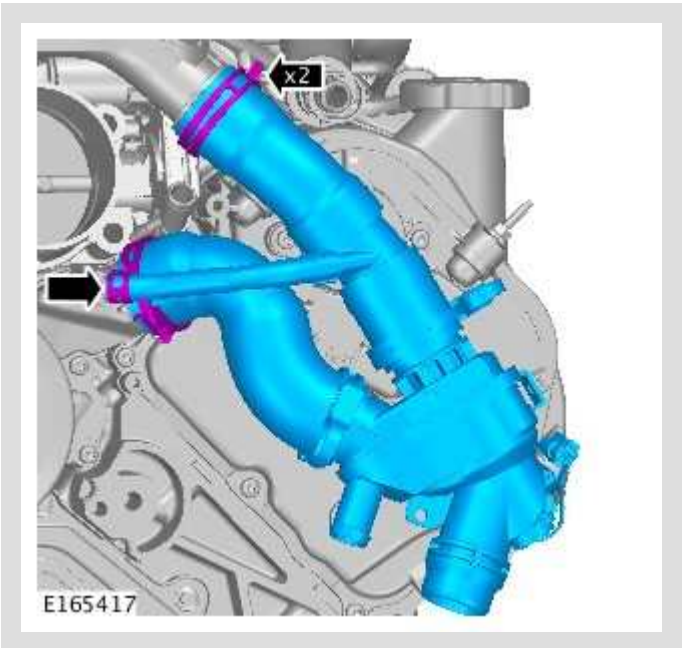


6.

cardiagn.com

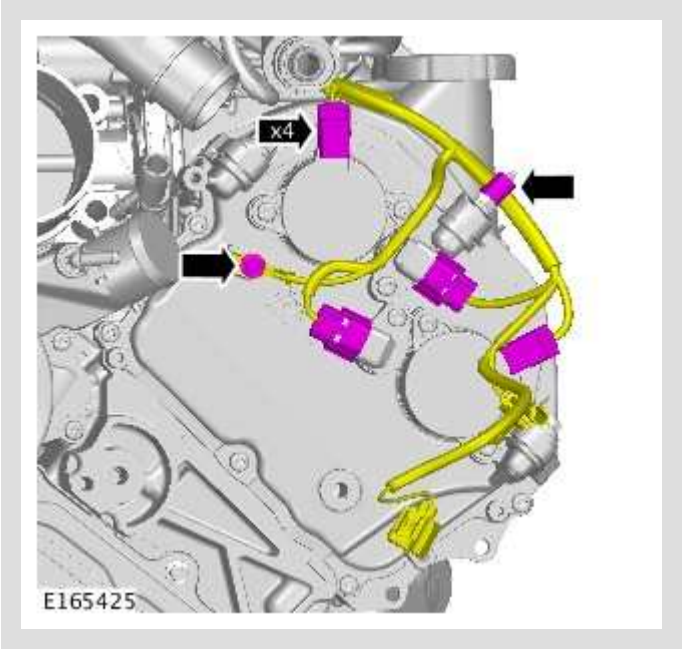


7.

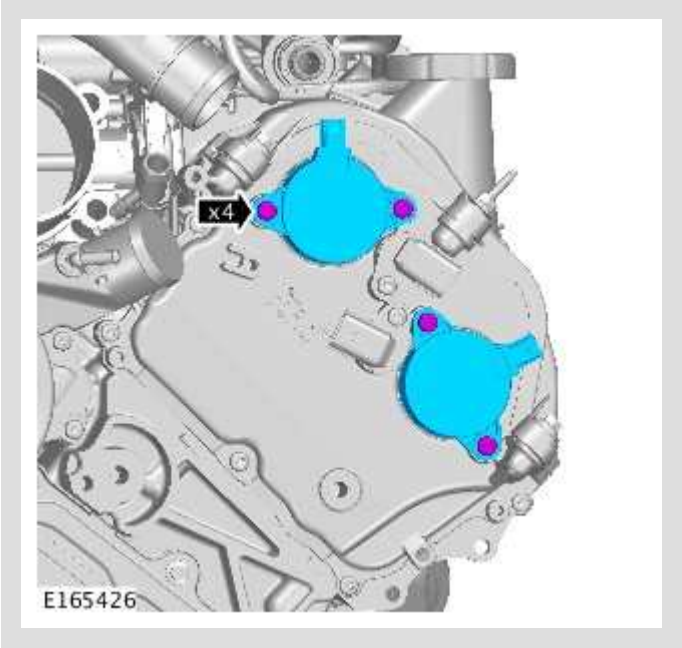


cardiagn.com

8.

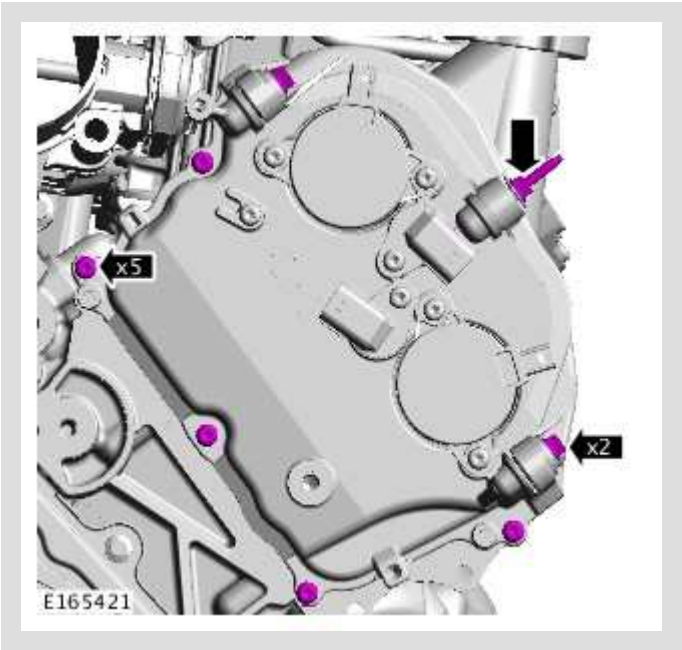


9.



10.

cardiagn.com



11.

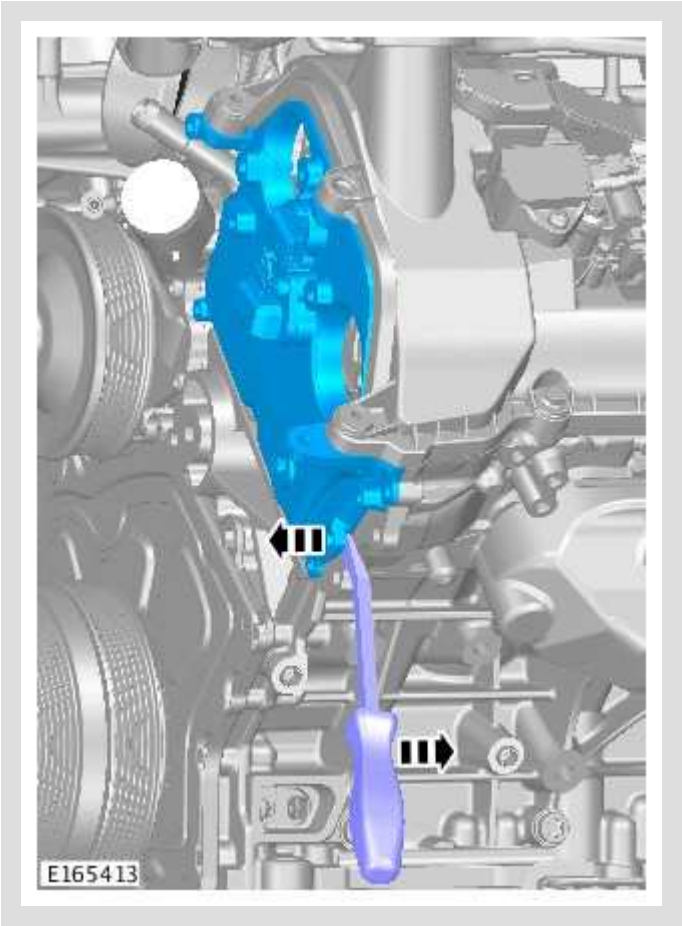
CAUTION:

Take extra care not to damage the component.

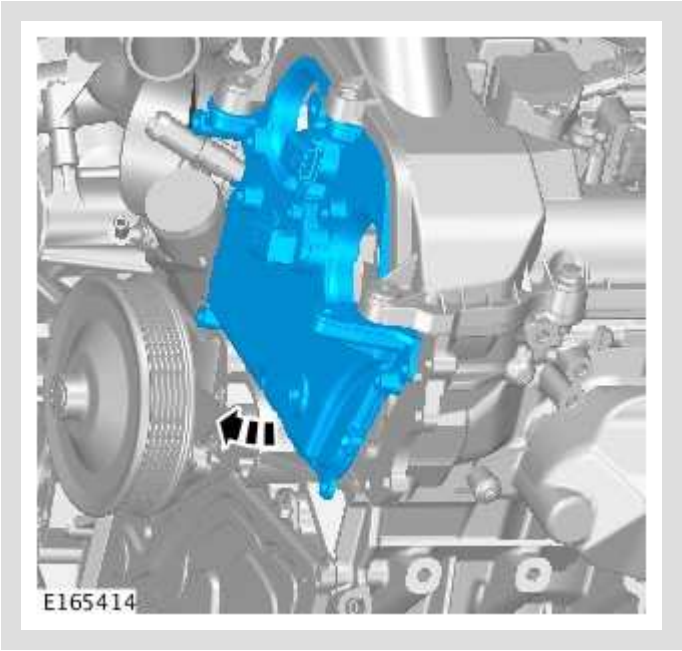
NOTE:

Make sure to use the aluminium lug provided on the timing cover to lever against.

cardiagn.com



12.

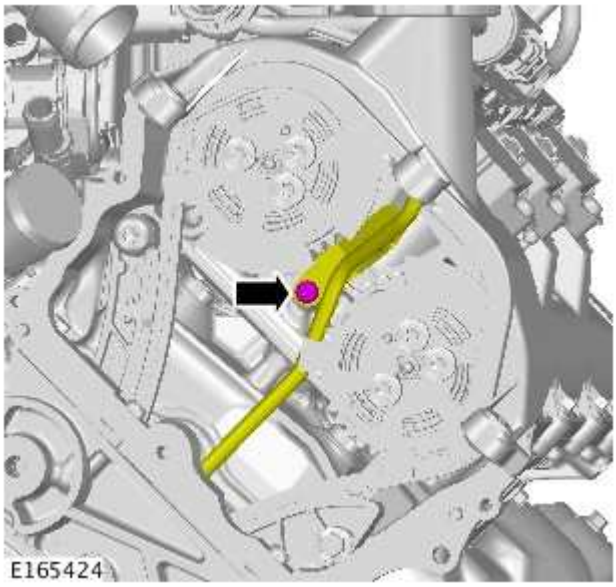


13.

cardiagn.com

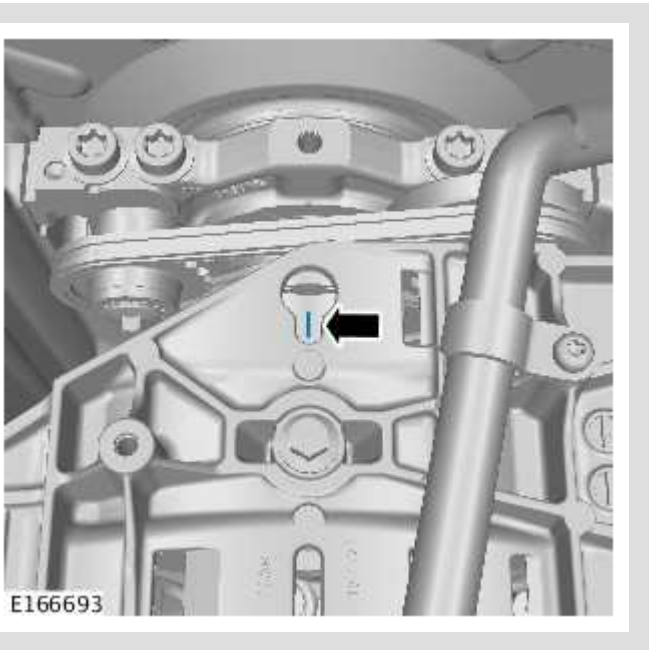
CAUTION:

Take extra care not to drop the bolt.



Hold the bolt with a magnet to prevent it from dropping.

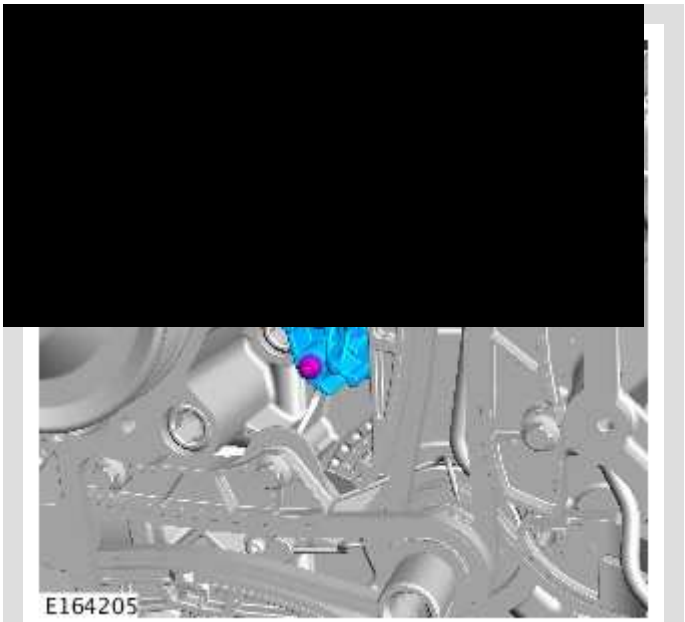
14.



Make sure the crankshaft is at the timed position.

15.

cardiagn.com

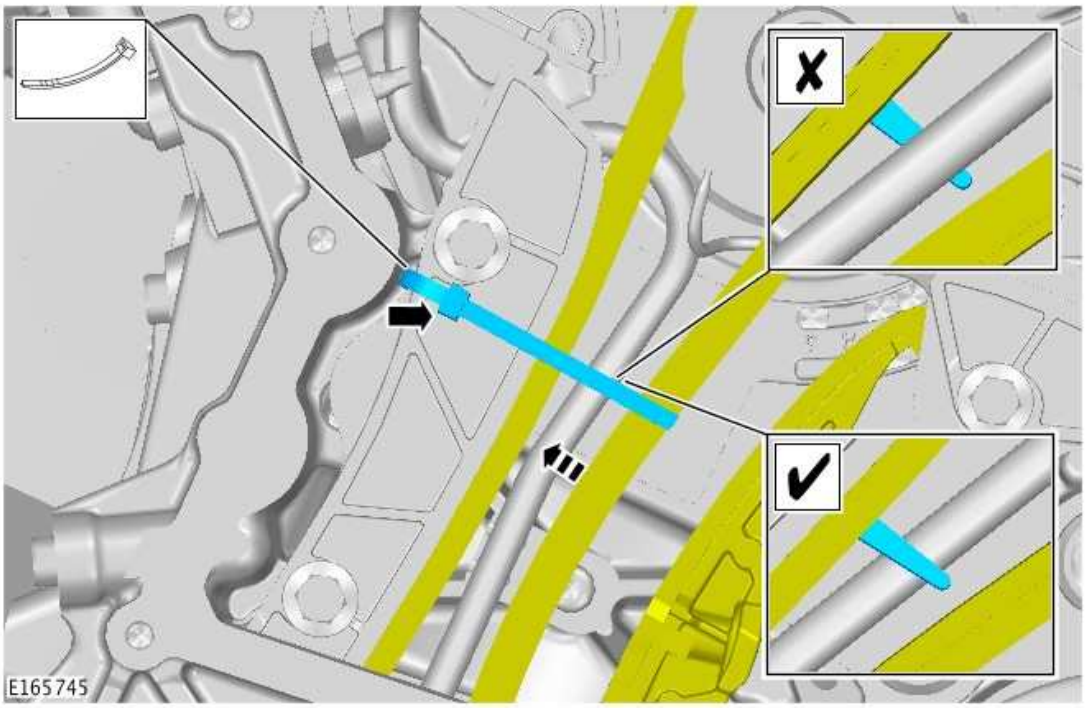


16.

CAUTION:

Using a tie strap, make sure the tension is maintained on the timing chain.

cardiagn.com

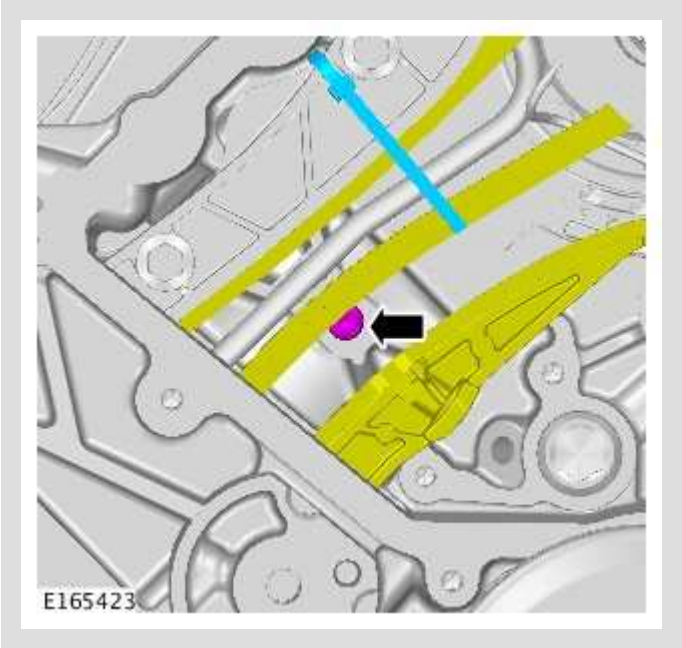


17.

CAUTION:

Use only a long torx socket or torx driver. Do not use a small torx socket, as it may damage the timing chain.

cardiagn.com



Hold the bolt with a magnet to prevent it from dropping.

18.

CAUTION:

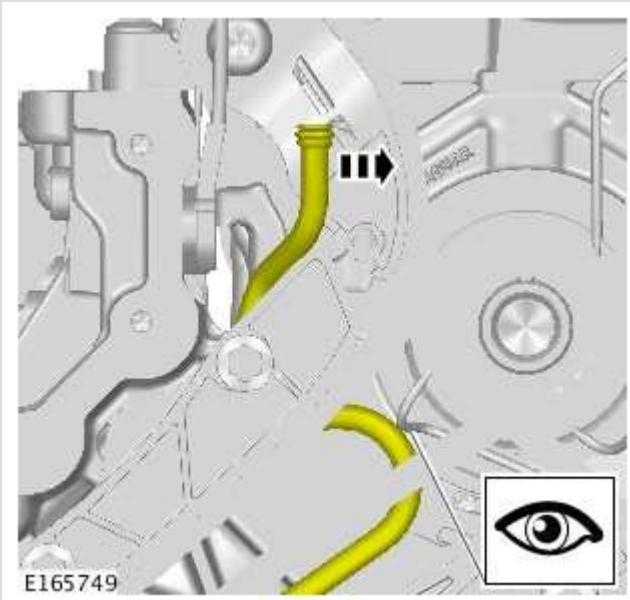
Take extra care not to damage the oil jet.

19.

cardiagn.com

CAUTION:

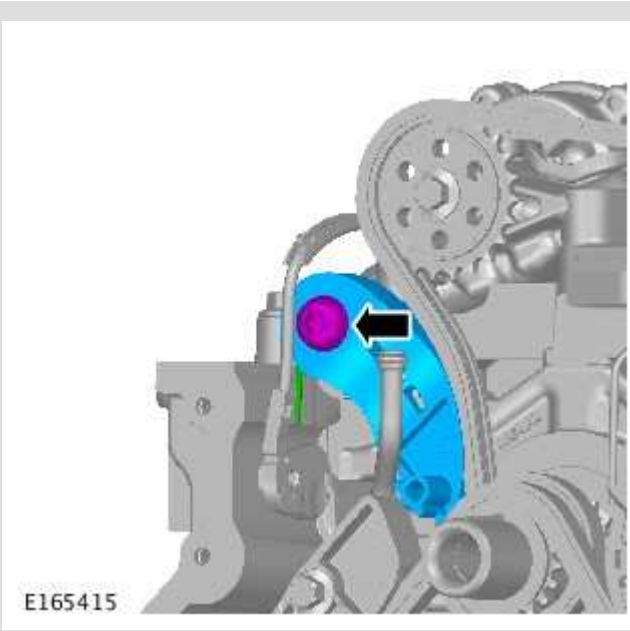
Take extra care not to damage the oil jet.



20.

CAUTION:

Take extra care not to damage the surrounding components.

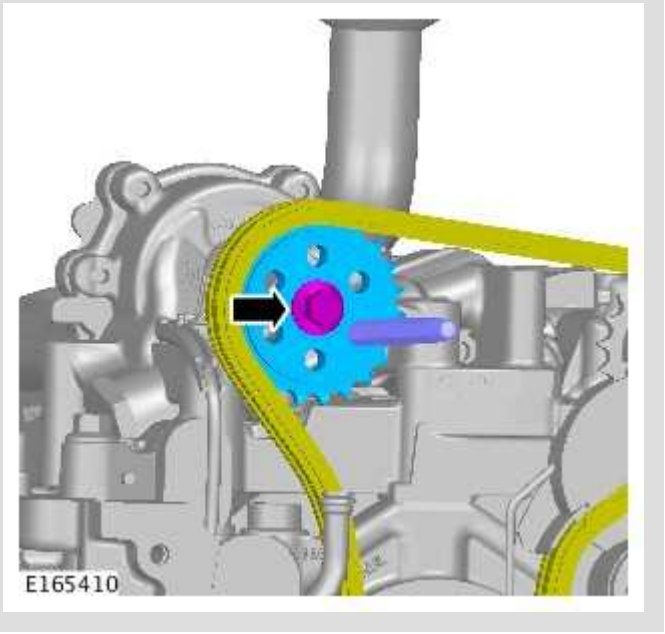


cardiagn.com

21.

CAUTION:

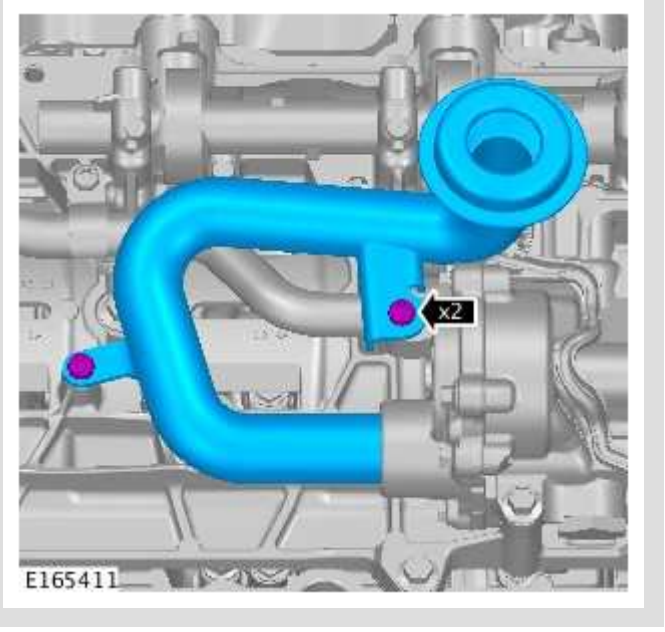
Using a suitable tool, lock the component.



22.

NOTE:

2WD vehicles.

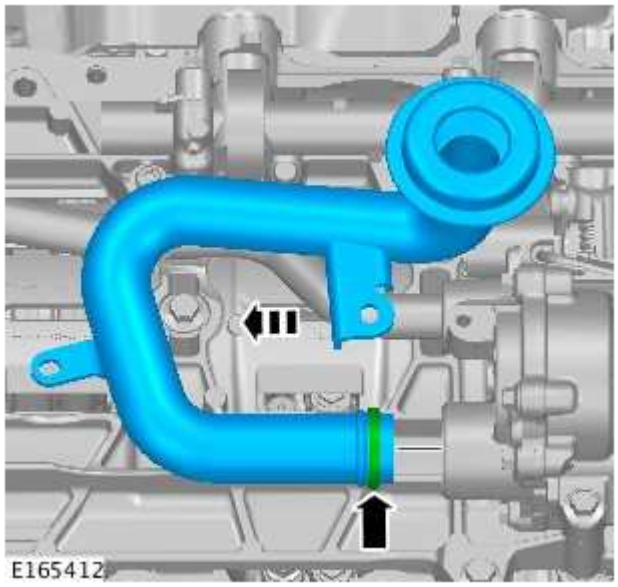


cardiagn.com

23.

NOTES:

- 2WD vehicles.
- Remove and discard the O-ring seal.

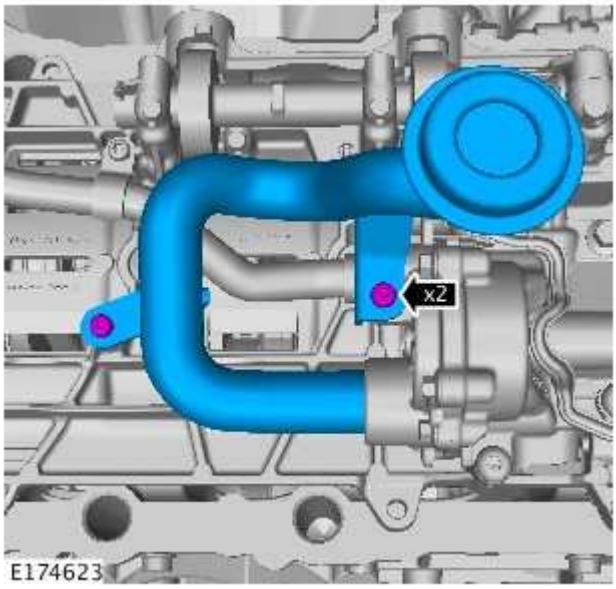


24.

NOTE:

4WD vehicles.

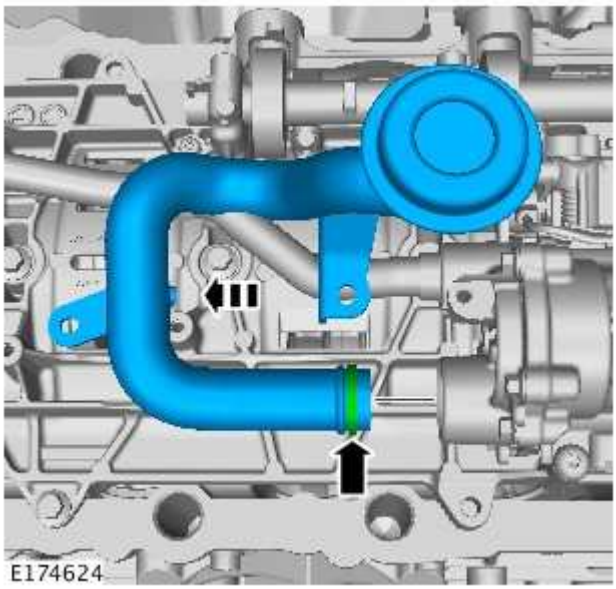
cardiagn.com



25.

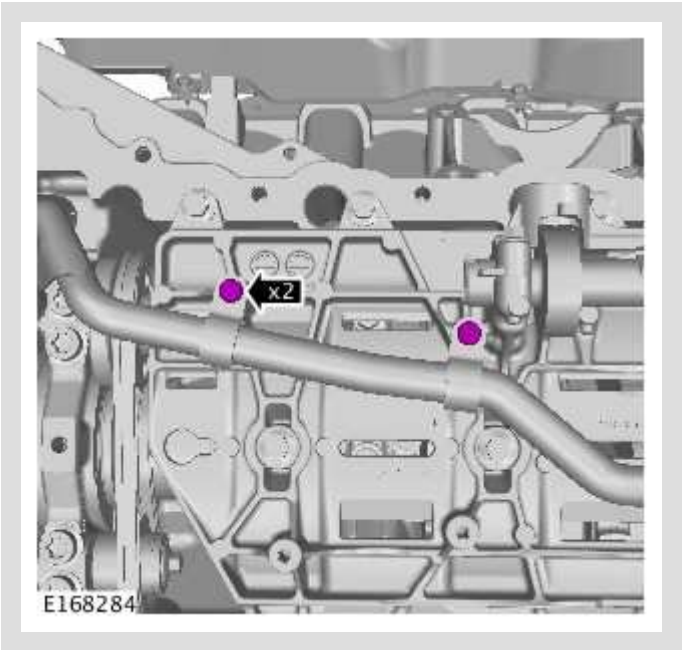
NOTES:

- 4WD vehicles.
- Remove and discard the O-ring seal.

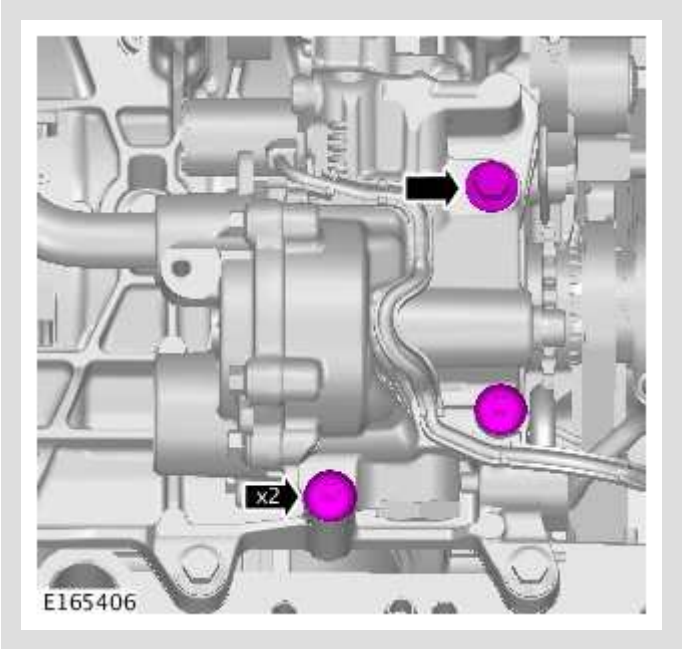


26.

cardiagn.com

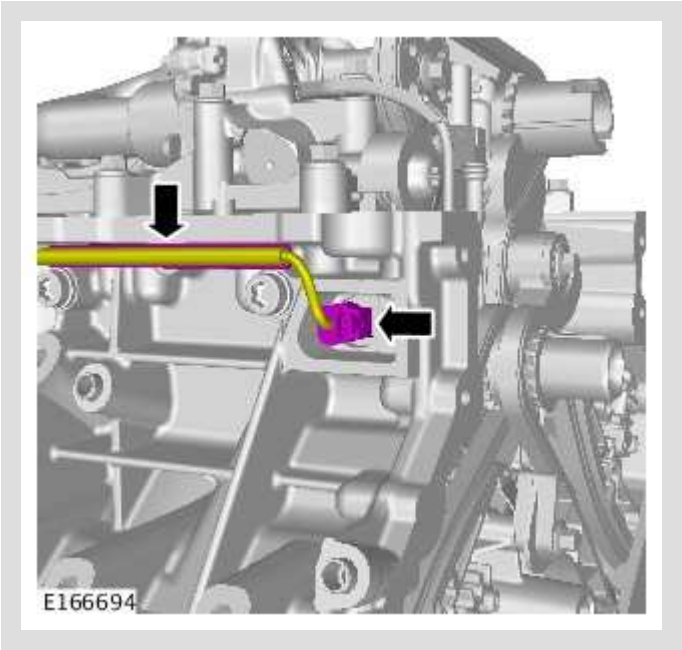


27.



28.

cardiagn.com

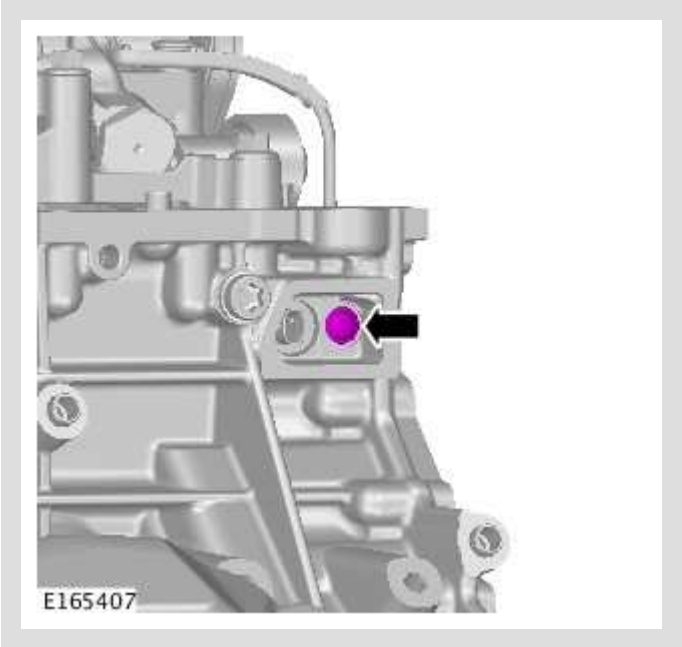


29.

CAUTION:

Discard the bolt.

cardiagn.com



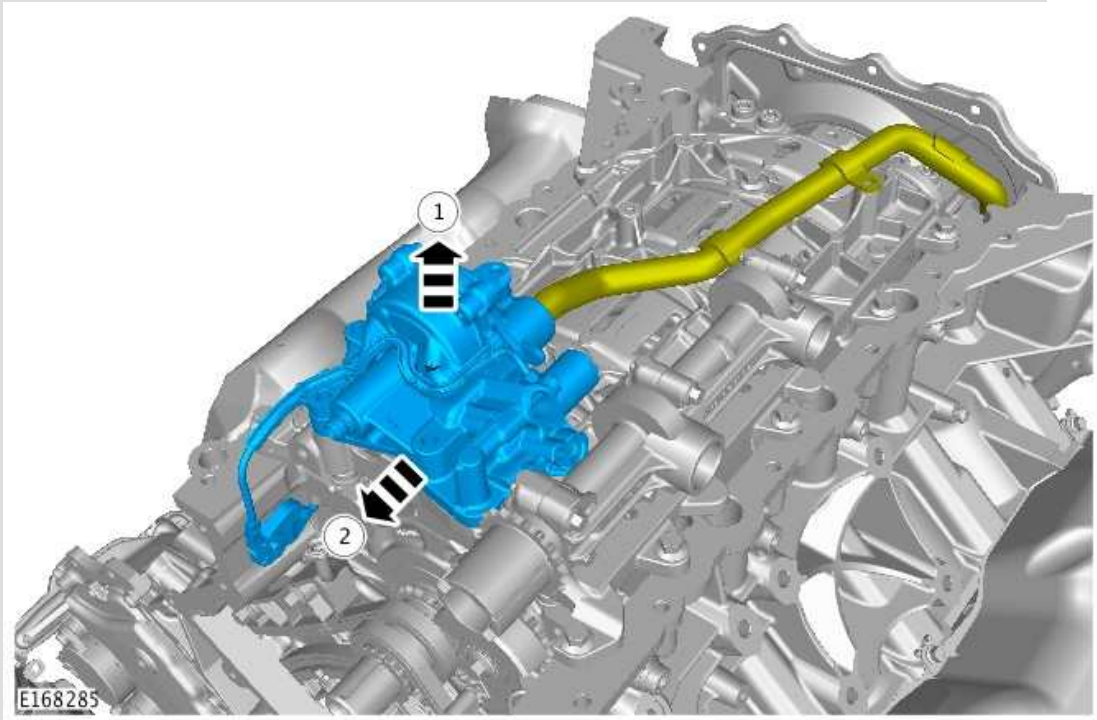
30.

CAUTION:

Take extra care not to damage the component.

31.

cardiagn.com

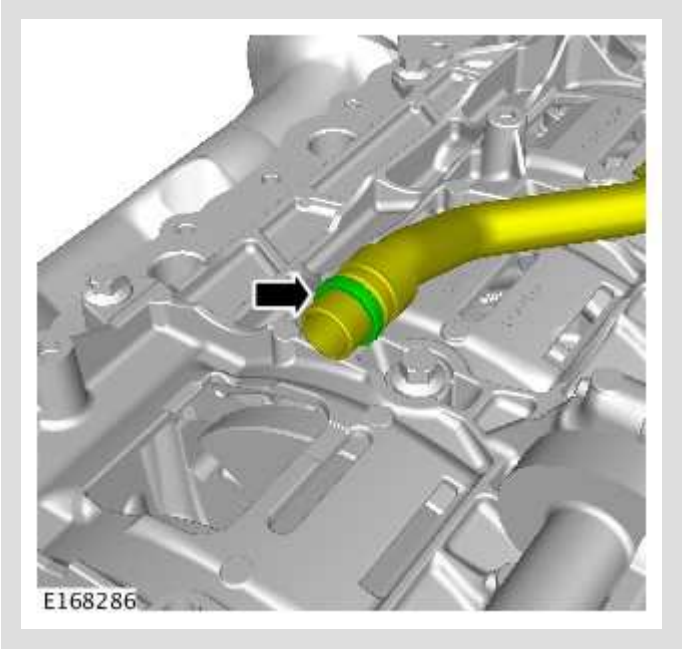


32.

CAUTION:

Remove and discard the O-ring seal.

cardiagn.com



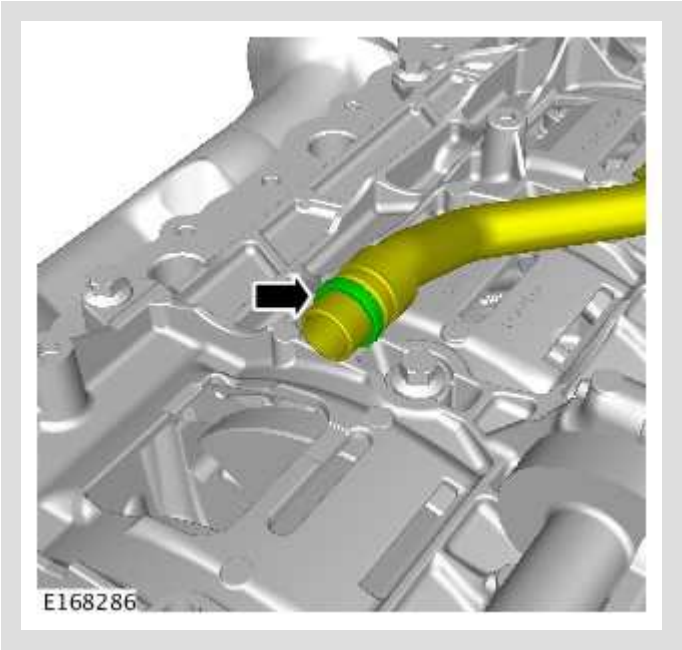
INSTALLATION

1.

CAUTION:

A new O-ring seal is to be installed.

cardiagn.com



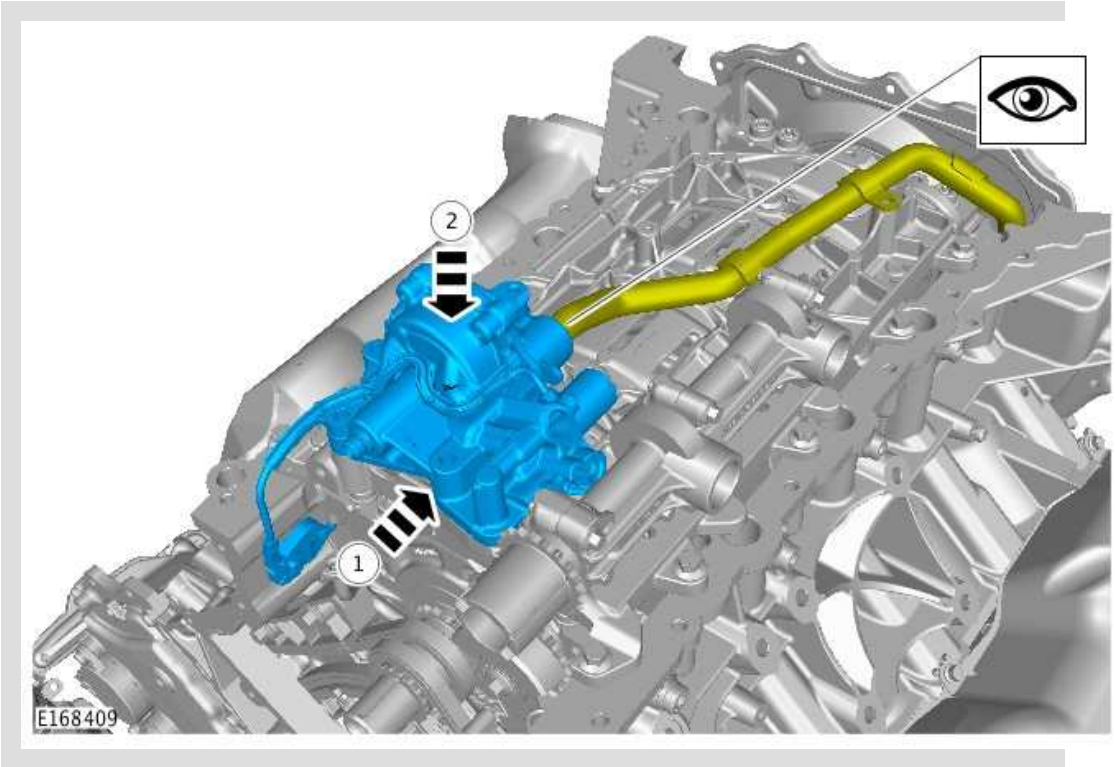
Lubricate the new O-ring seal.

2.

CAUTIONS:

- Install the component shown in the sequence shown.
- Take extra care not to damage the seal when installing the component.

cardiagn.com

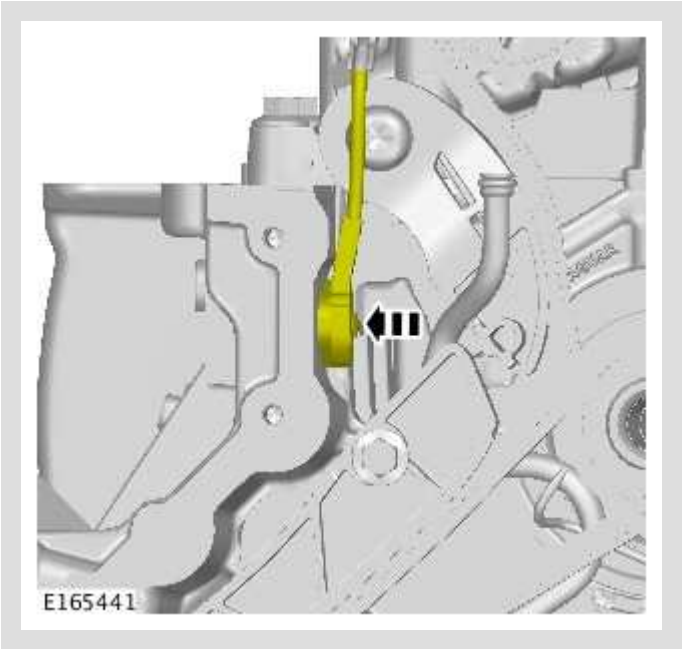


3.

CAUTION:

Take extra care when installing the component.

cardiagn.com

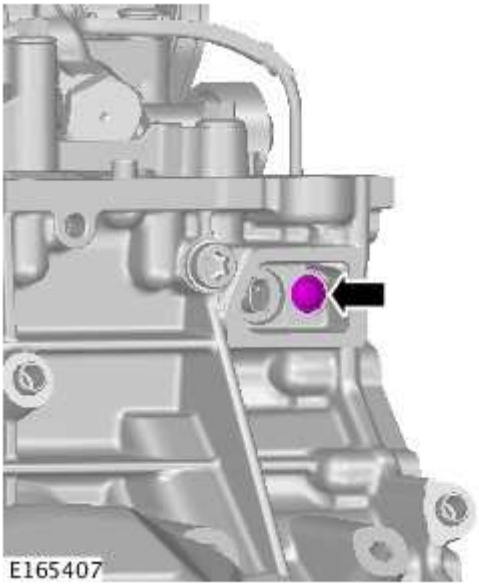


4.

CAUTION:

Make sure that a new bolt is installed.

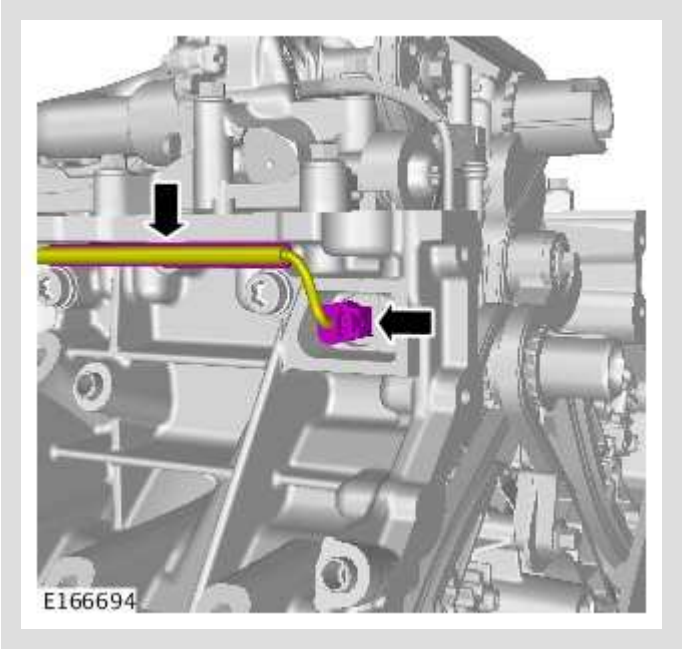
cardiagn.com



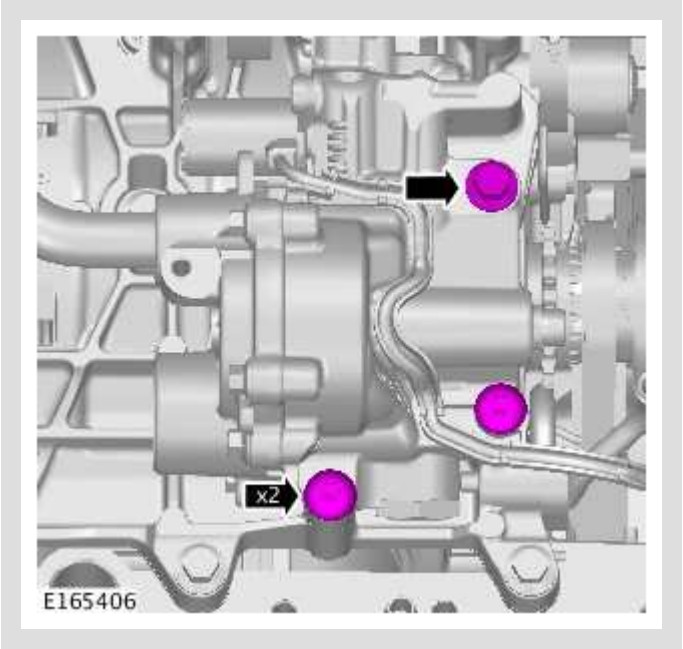
Torque: **12 Nm**

5.

cardiagn.com



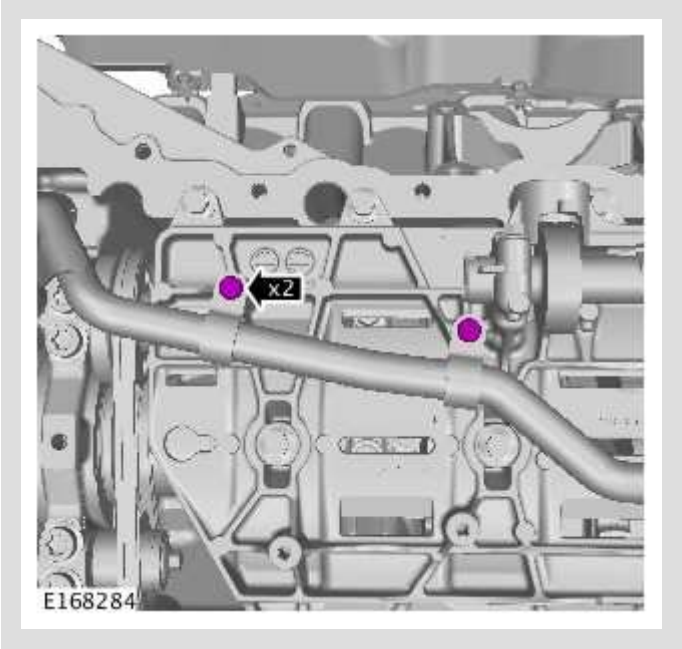
6.



Torque: **25 Nm**

7.

cardiagn.com



Torque: **12 Nm**

8.

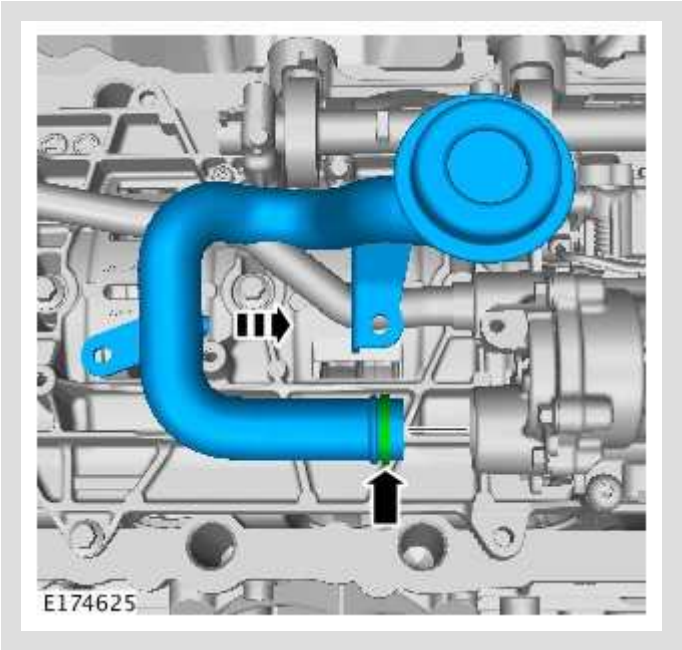
CAUTION:

A new O-ring seal is to be installed.

NOTE:

4WD vehicles.

cardiagn.com

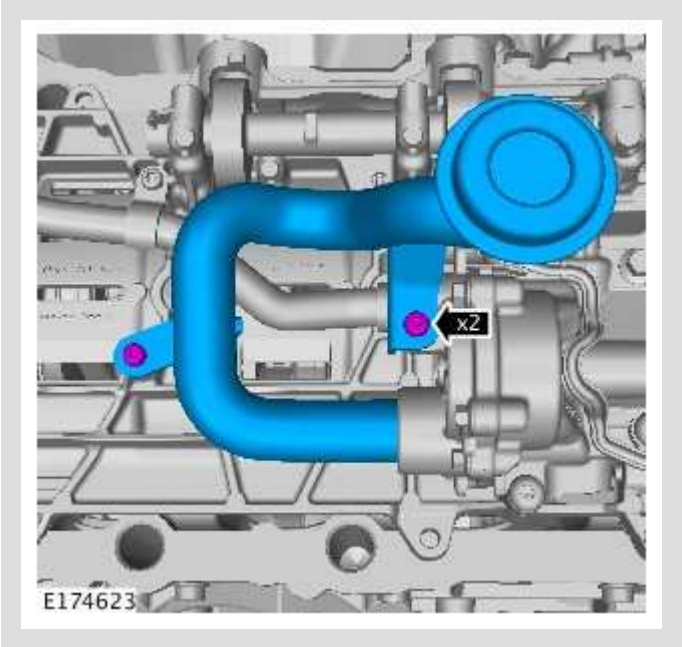


Lubricate the new O-ring seal.

9.

NOTE:

4WD vehicles.



Torque: **12 Nm**

cardiagn.com

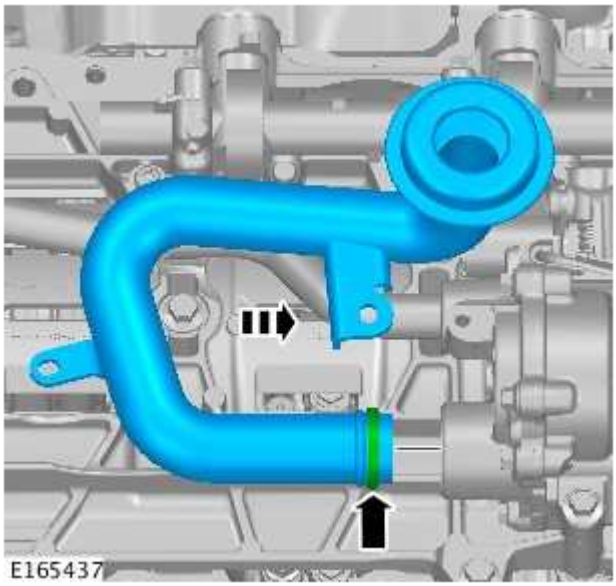
10.

CAUTION:

A new O-ring seal is to be installed.

NOTE:

2WD vehicles.



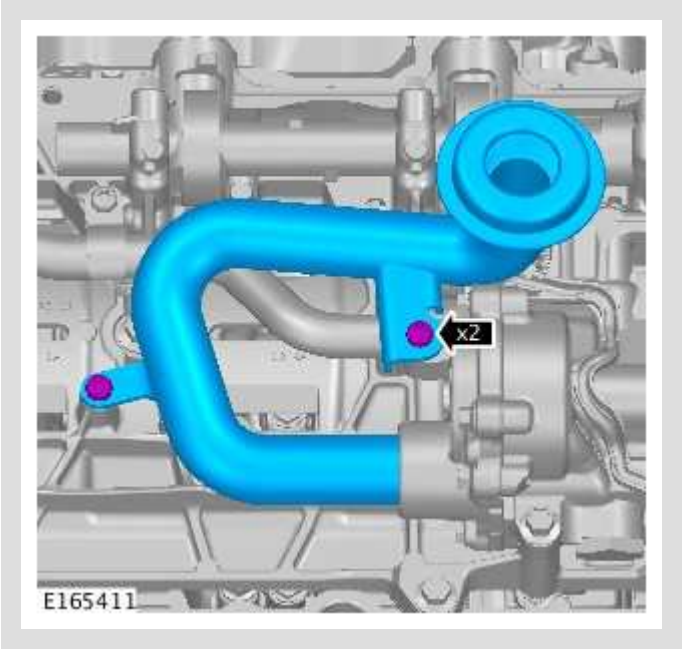
Lubricate the new O-ring seal.

11.

NOTE:

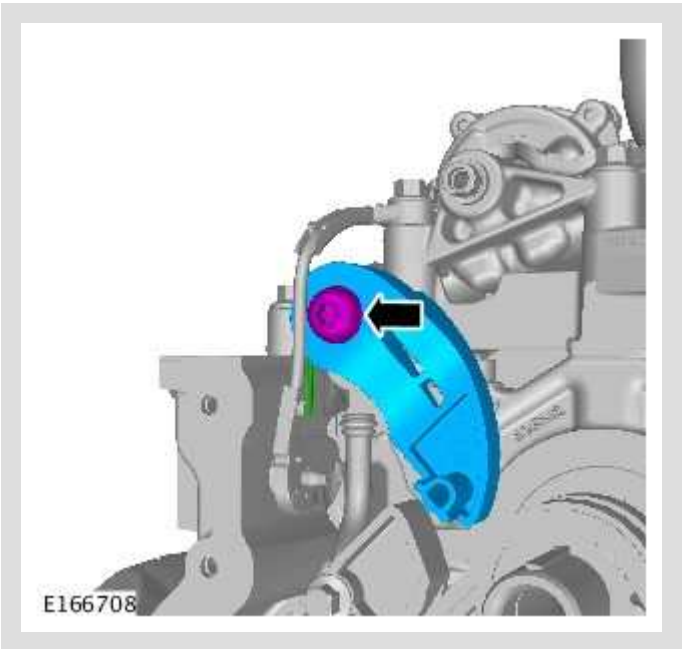
2WD vehicles.

cardiagn.com



Torque: **12 Nm**

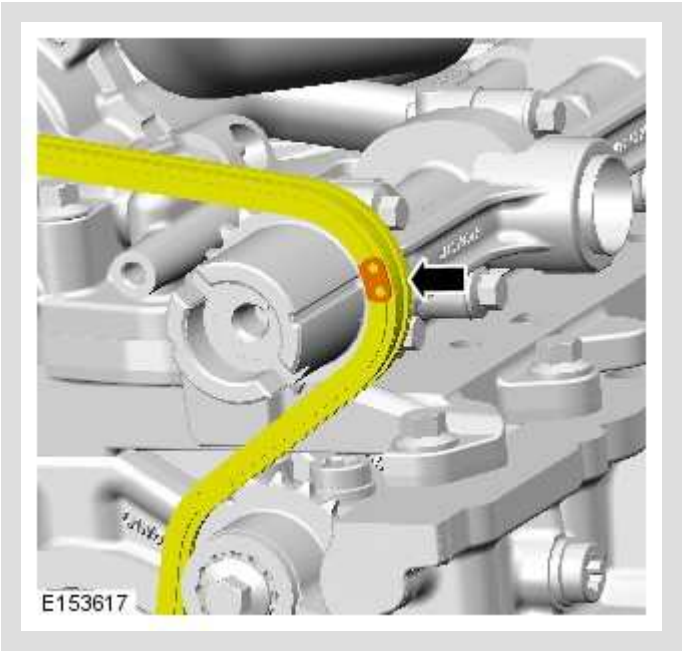
12.



Torque: **21 Nm**

cardiagn.com

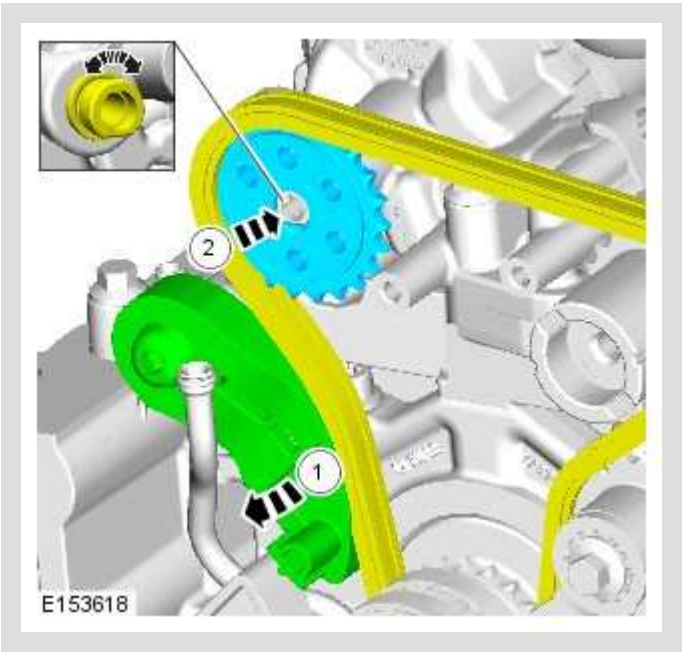
13.



14.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.



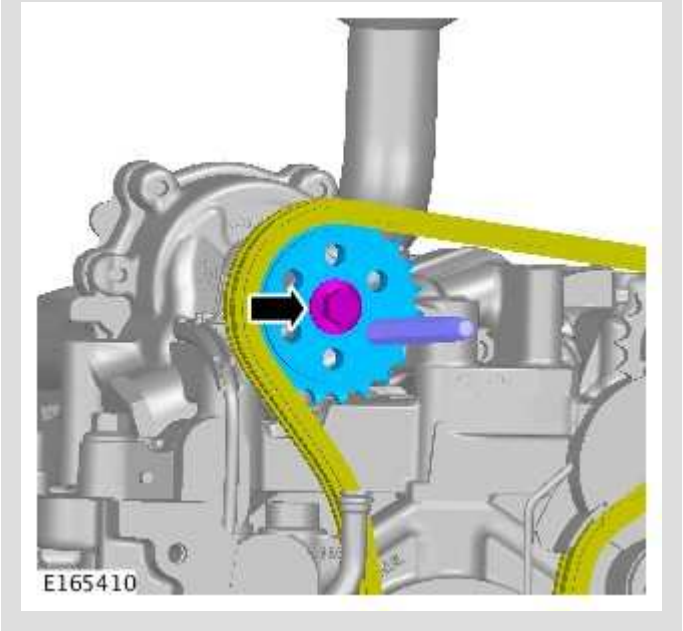
Using a suitable tool, compress the timing chain tensioner.

15.

cardiagn.com

CAUTION:

Using a suitable tool, lock the component.



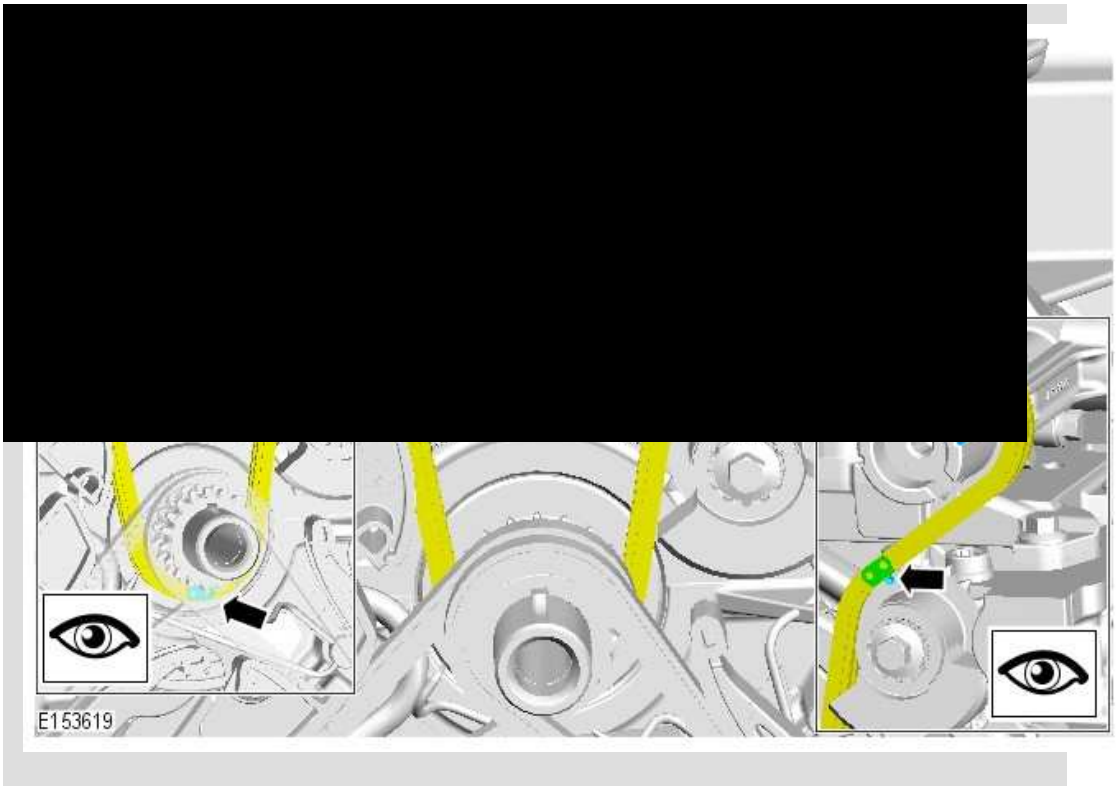
Torque: **21 Nm**

16.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

cardiagn.com



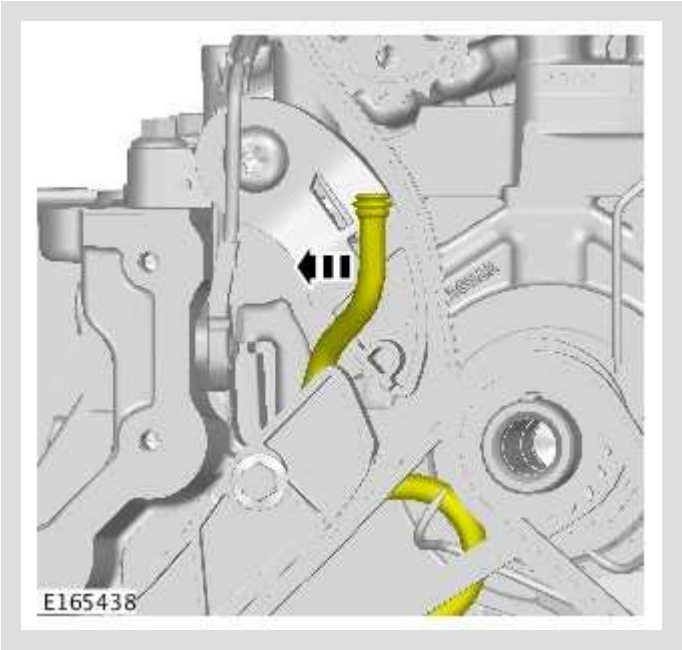
Install the lower timing chain making sure the coloured chain links align correctly with the fuel rail high-pressure fuel pumps camshaft, balance weight and crankshaft sprocket markings.

17.

CAUTION:

Take extra care not to damage the oil jet.

cardiagn.com



18.

CAUTION:

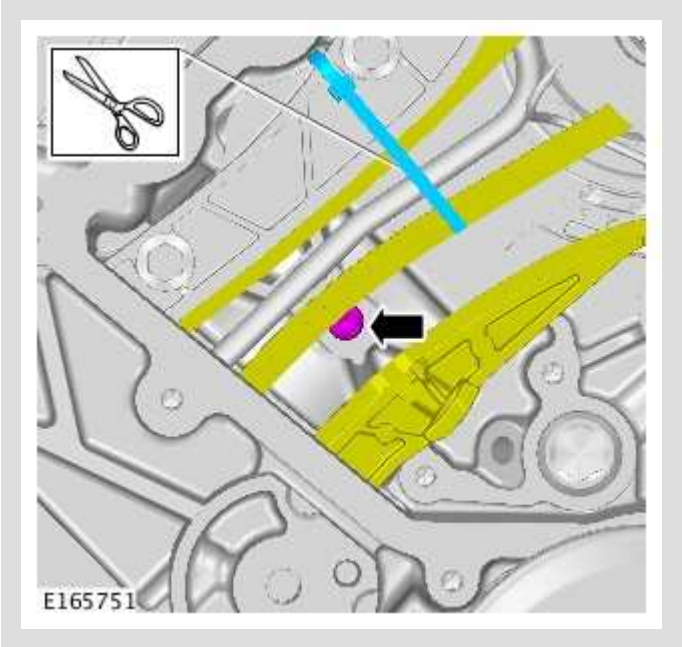
Take extra care not to damage the oil jet.

19.

cardiagn.com

CAUTION:

Use only a long torx socket or torx driver. Do not use a small torx socket, as it may damage the timing chain.



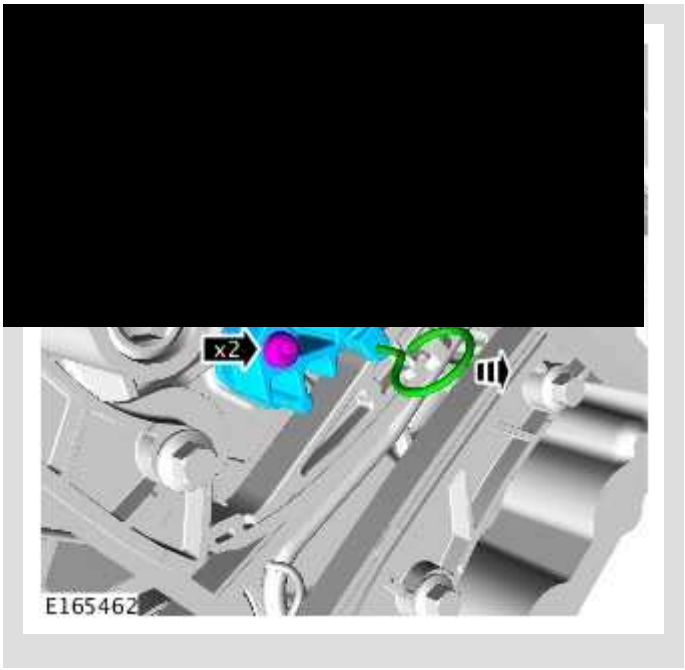
Hold the bolt with a magnet to prevent it from dropping.

Torque: **10 Nm**

20.

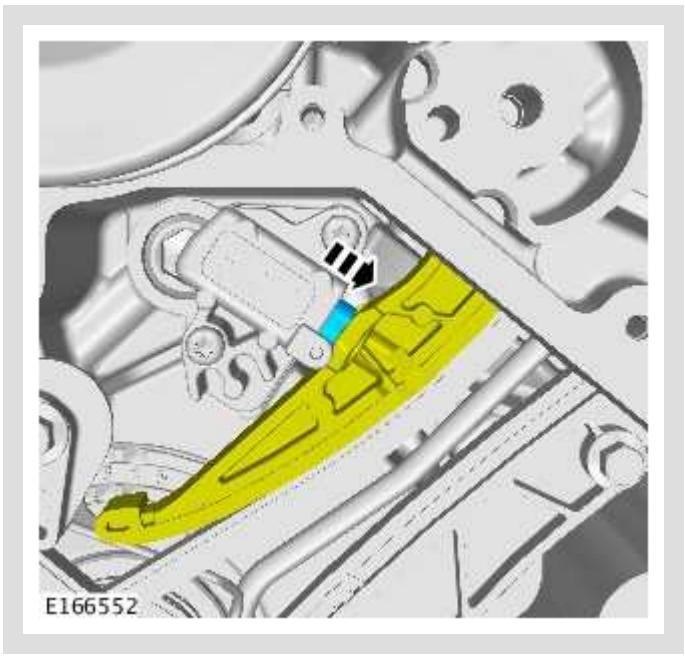
21.

cardiagn.com



Torque: **12 Nm**

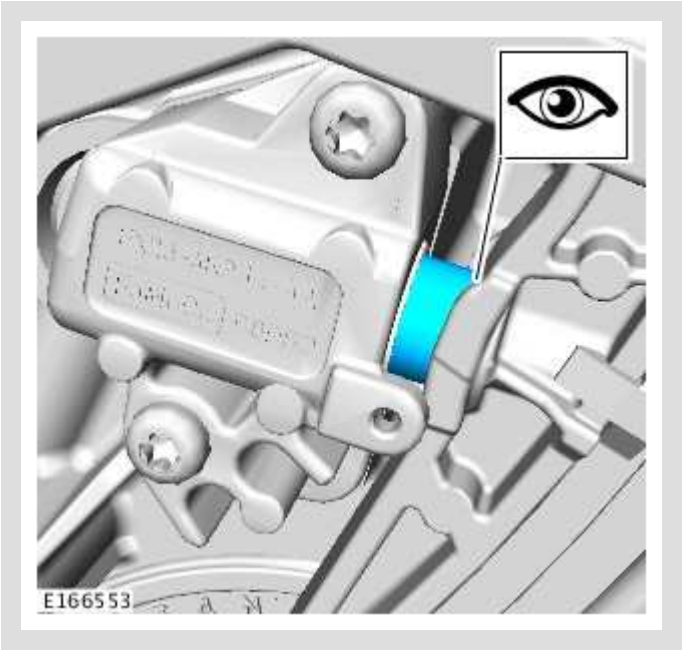
22.



Rotate the crankshaft a full turn clockwise to settle the components.

23.

cardiagn.com



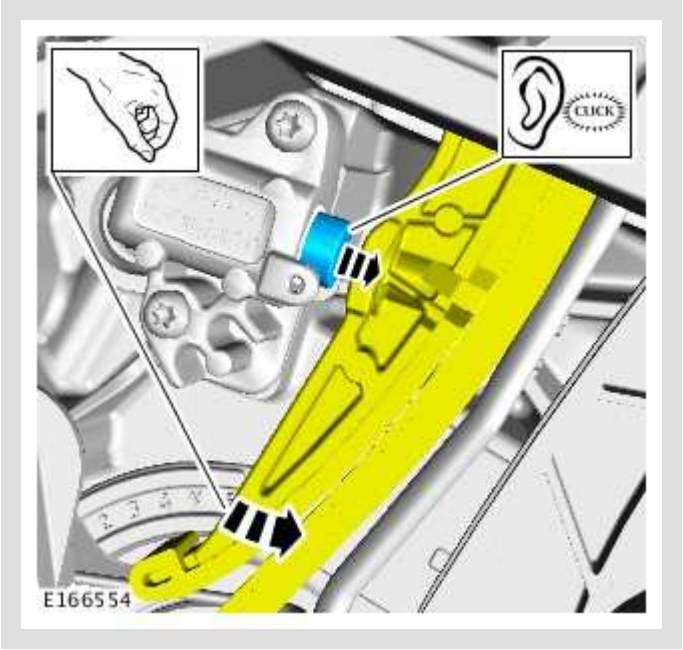
The piston should apply tension to the timing chain guide.

24.

CAUTION:

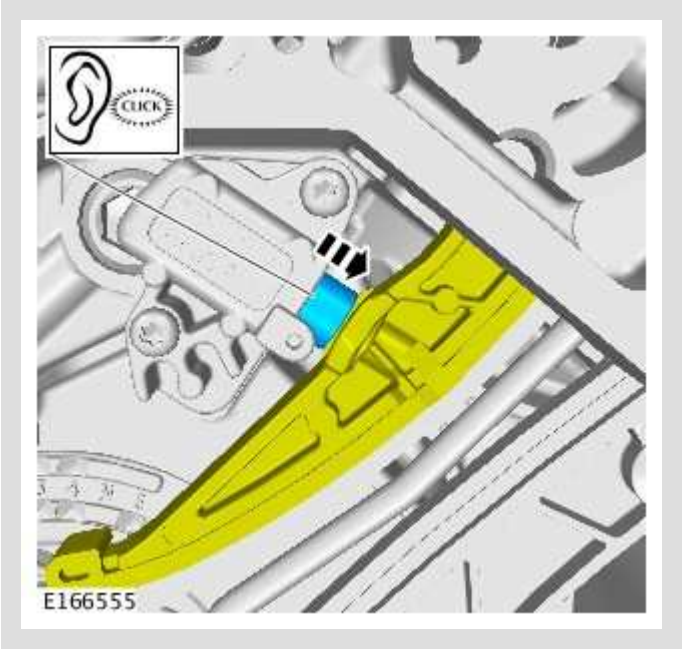
Make sure the tension is maintained.

cardiagn.com



Using considerable force, move the timing chain guide away from the tensioner to allow the first stage ratchet mechanism to be applied.

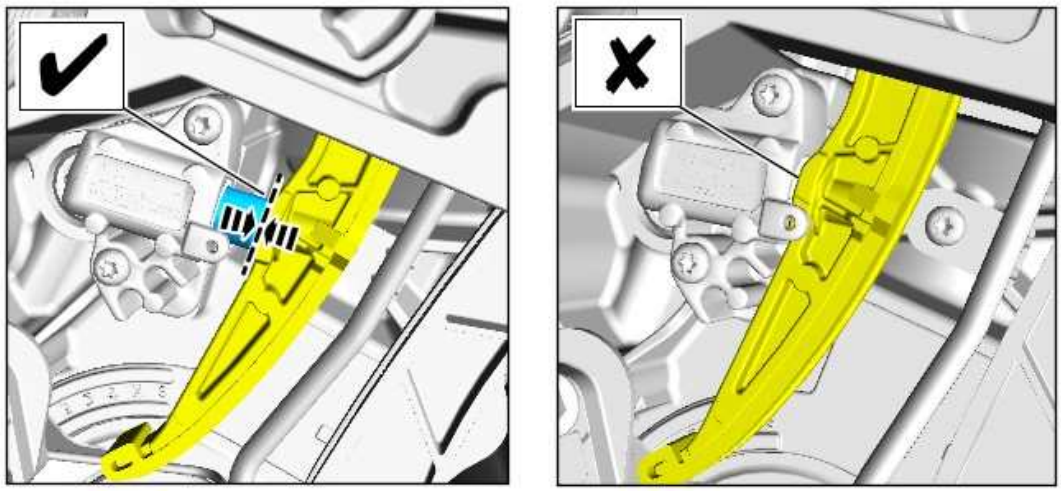
25.



The piston should eject slightly, and an audible click should be heard.

26.

cardiagn.com



E166556

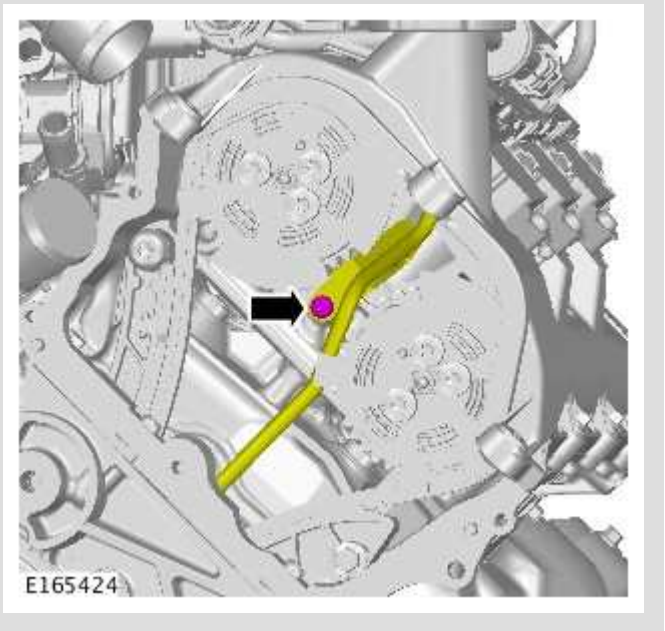
If the piston can be pushed back, repeat steps 19-22 to reset the tensioner.

cardiagn.com

27.

If the piston will not retract, and tension is on the chain. The tensioner is correct.

28.



Hold the bolt with a magnet to prevent it from dropping.
Torque: **10 Nm**

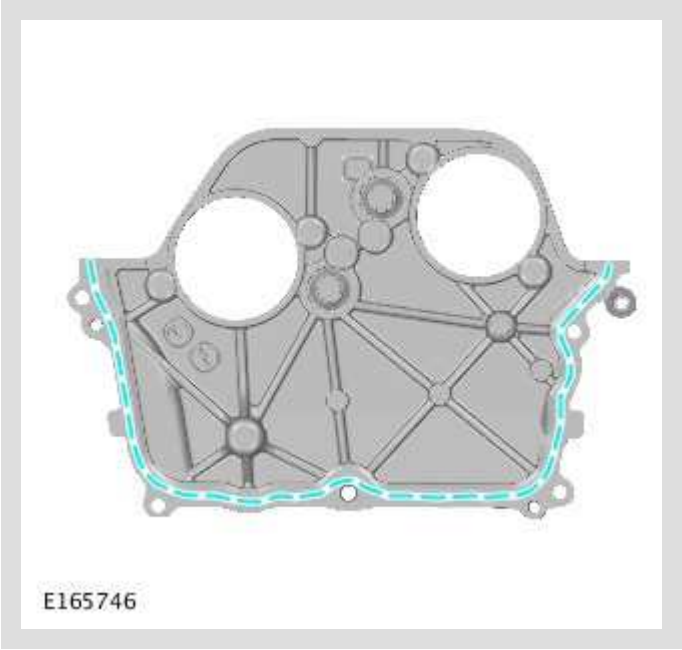
29.

NOTE:

Make sure that all traces of the old sealant are removed from the mating faces.

cardiagn.com

30.



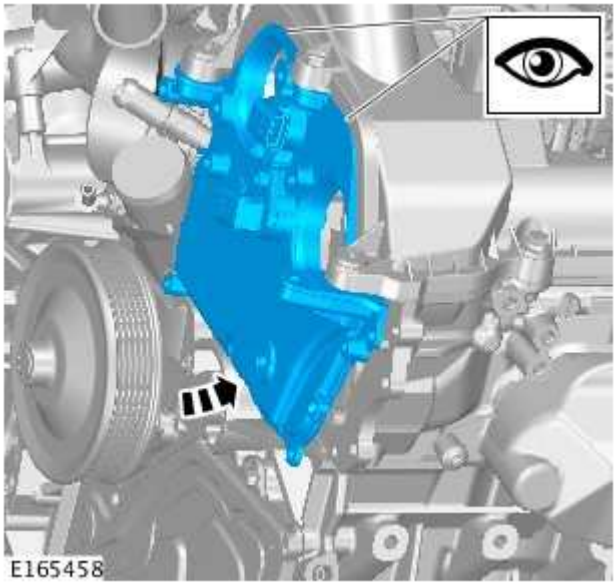
Apply RTV sealant (Loctite 5901G) to the areas shown, and tighten the bolts within 7 minutes.

31.

CAUTION:

Take extra care not to damage the seal when installing the component.

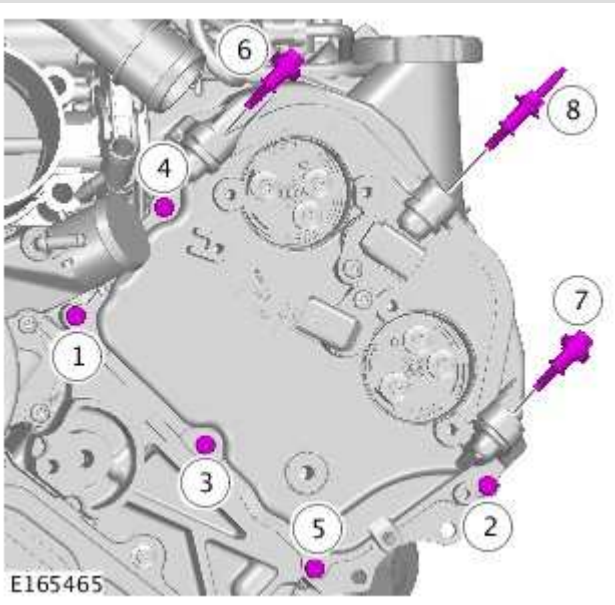
cardiagn.com



32.

NOTE:

Tighten the retaining bolts in the indicated sequence.

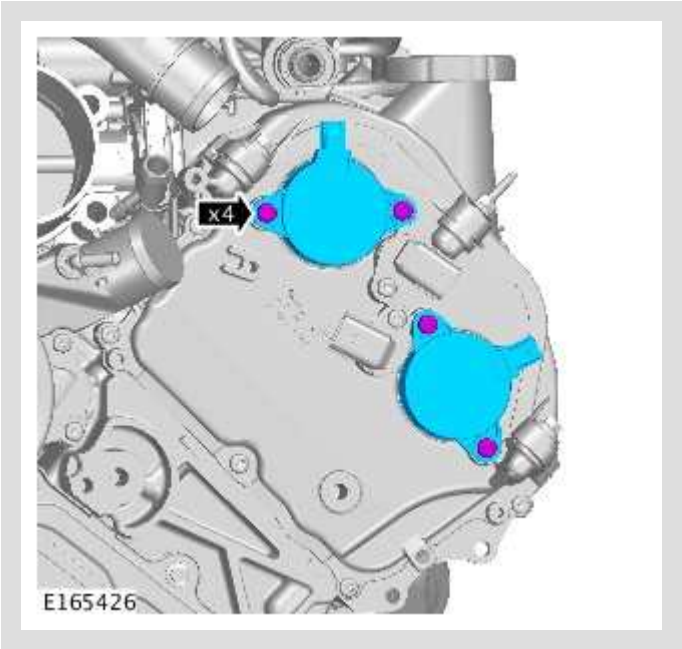


13

Torque: **12 Nm**

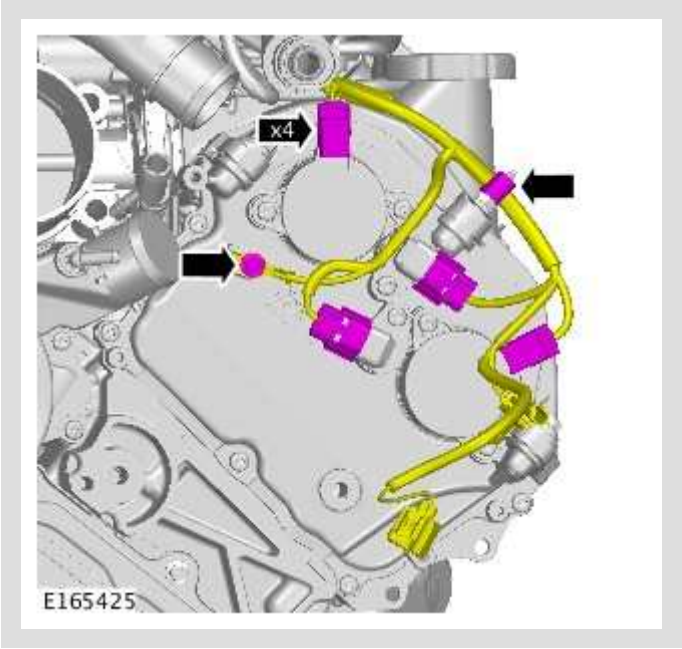
33.

cardiagn.com



Torque: **10 Nm**

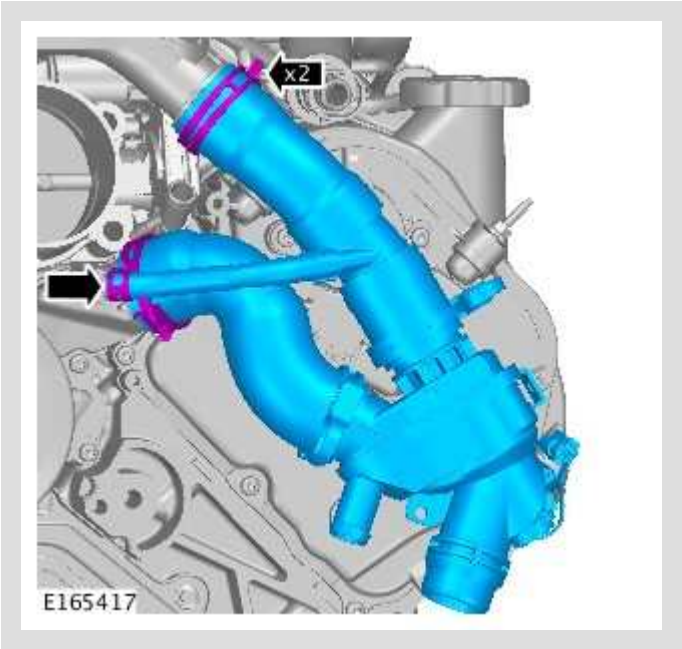
34.



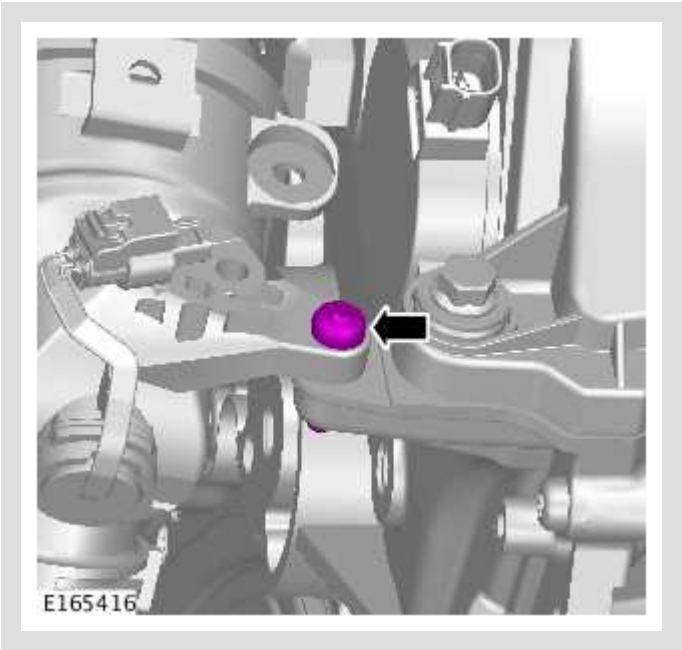
Torque: **10 Nm**

35.

cardiagn.com



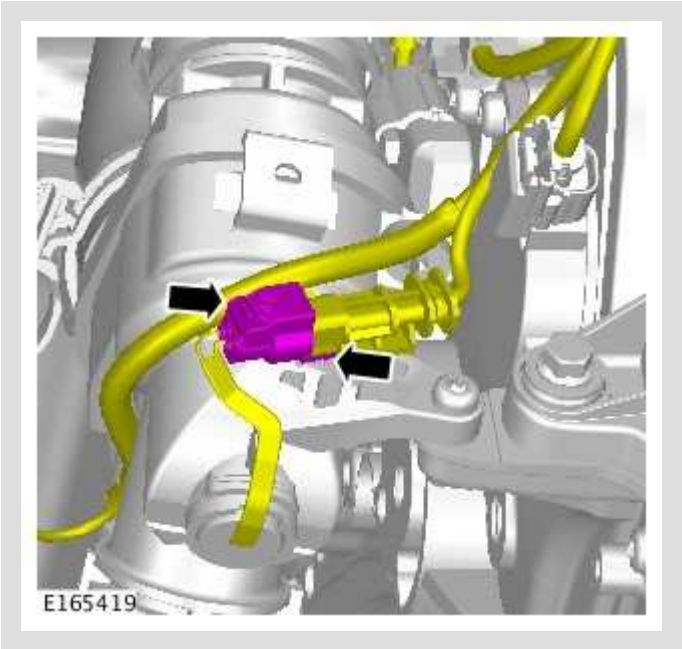
36.



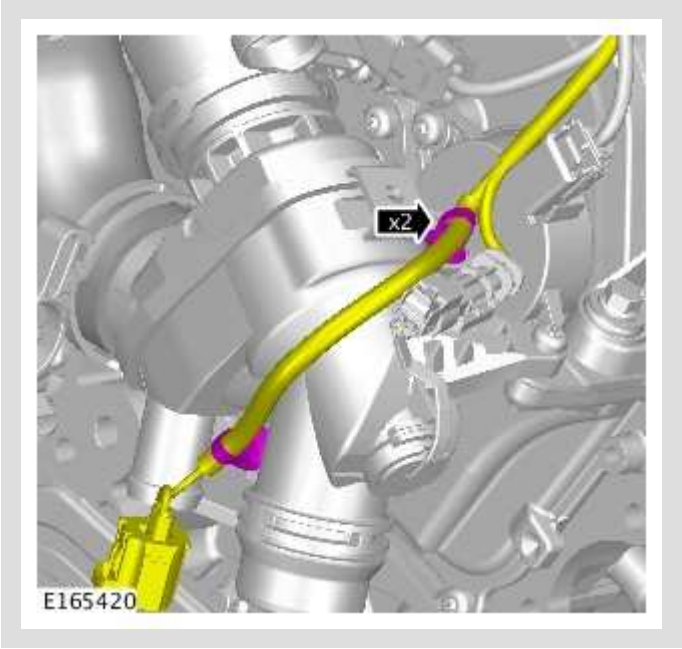
Torque: **10 Nm**

37.

cardiagn.com



38.



39. Refer to: Oil Pan Extension (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Oil Pan (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

40. Connect the battery ground cable.

cardiagn.com

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

OIL PAN (G1774730)

REMOVAL AND INSTALLATION

12.60.44	OIL PAN - RENEW	ALL DERIVATIVES	0.8	USED WITHINS

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

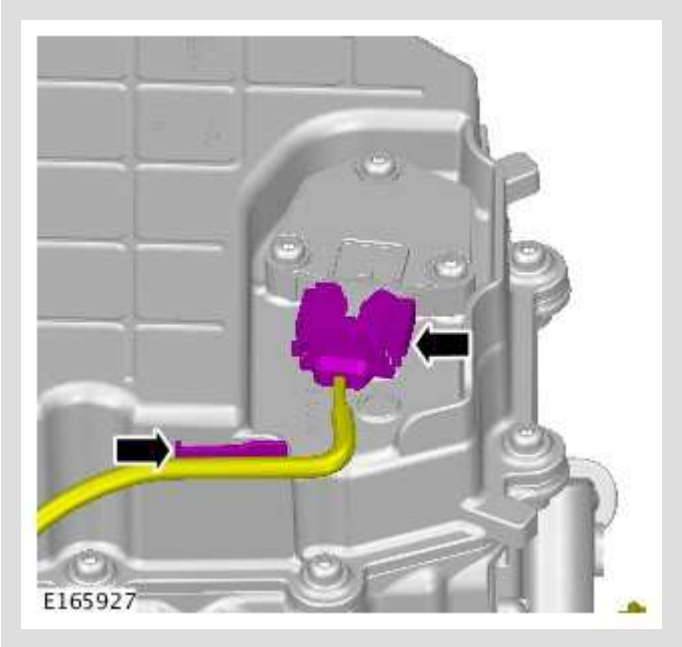
cardiagn.com

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

3. Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

4.

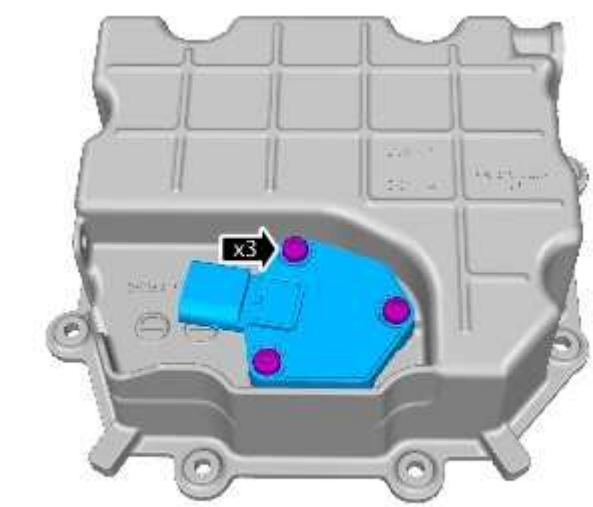


5.

6. **NOTE:**

cardiagn.com

Do not disassemble further if the component is removed for access only.



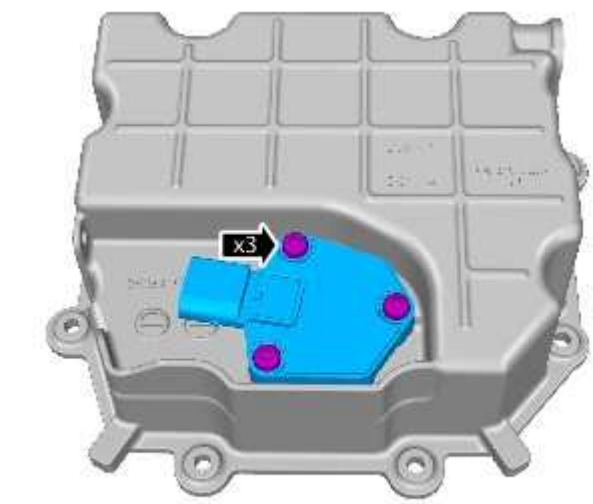
E166368

INSTALLATION

1.

NOTE:

Lubricate the seal with clean engine oil.



E166368

cardiagn.com

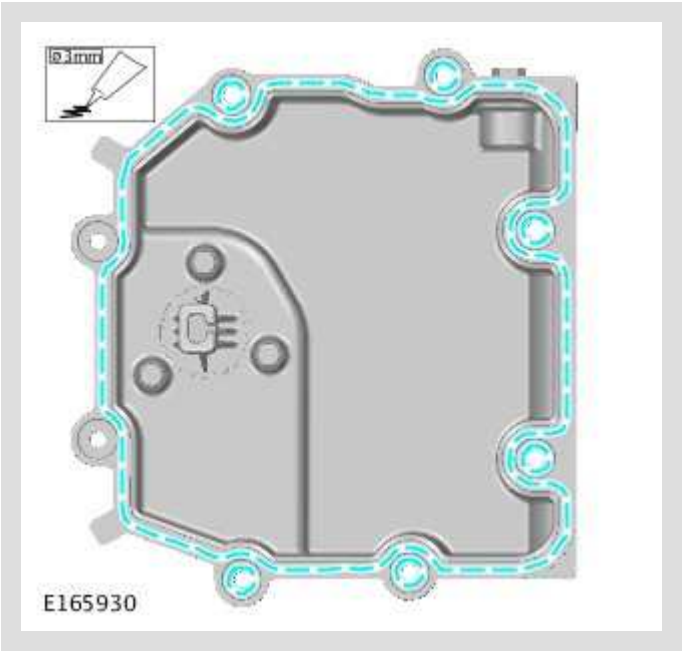
Torque: **12 Nm**

2.

CAUTIONS:

Make sure that the mating faces are clean and free of foreign material.

Use only a plastic scraper when removing the sealing material.



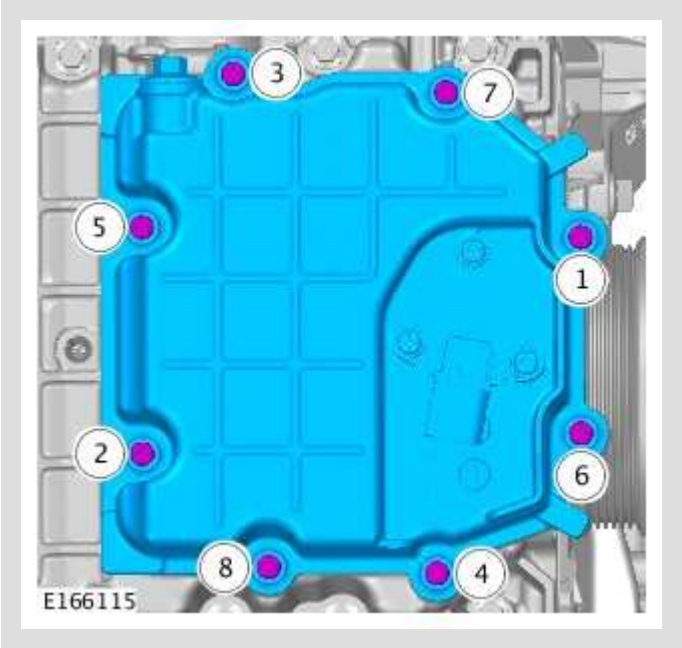
Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and tighten the bolts within 7 minutes.

3.

NOTE:

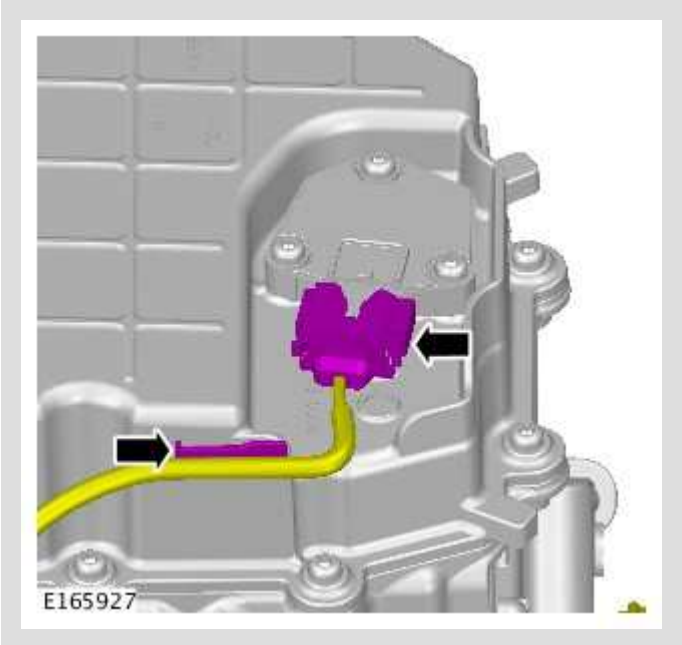
Tighten the bolts in the indicated sequence.

cardiagn.com



Torque: **12 Nm**

4.



5. Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

6. Connect the battery ground cable.

cardiagn.com

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

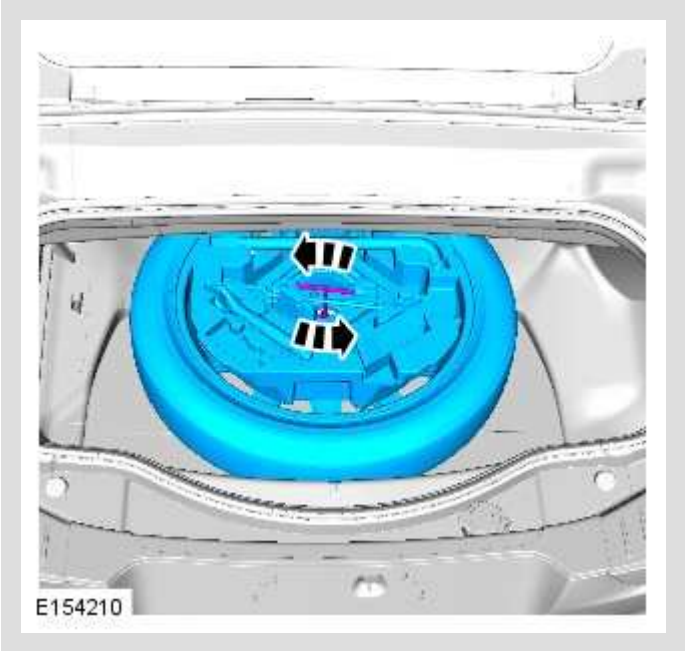
1.

cardiagn.com

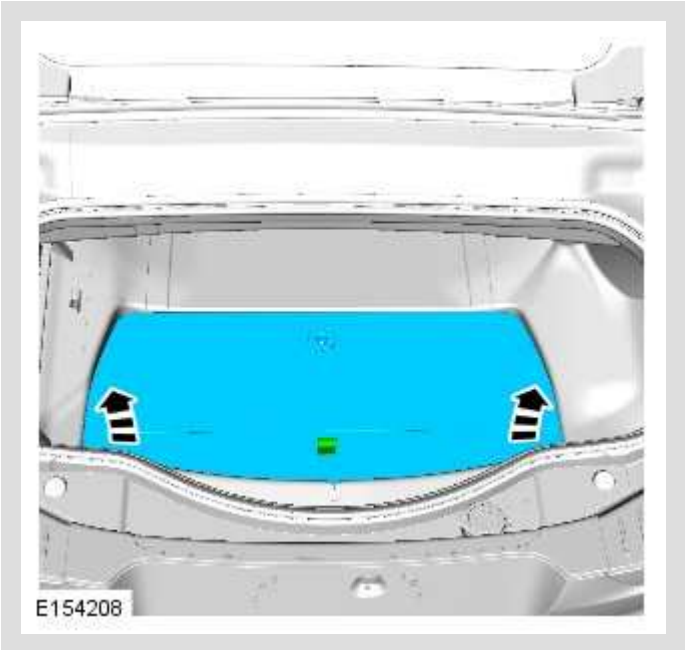
Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

2. Obtain and record the audio unit preset radio frequencies.

3.

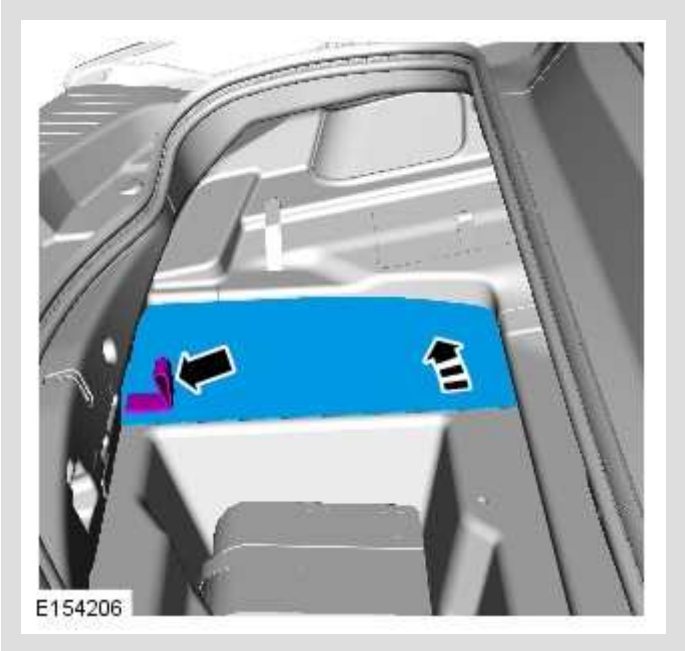


4.



5.

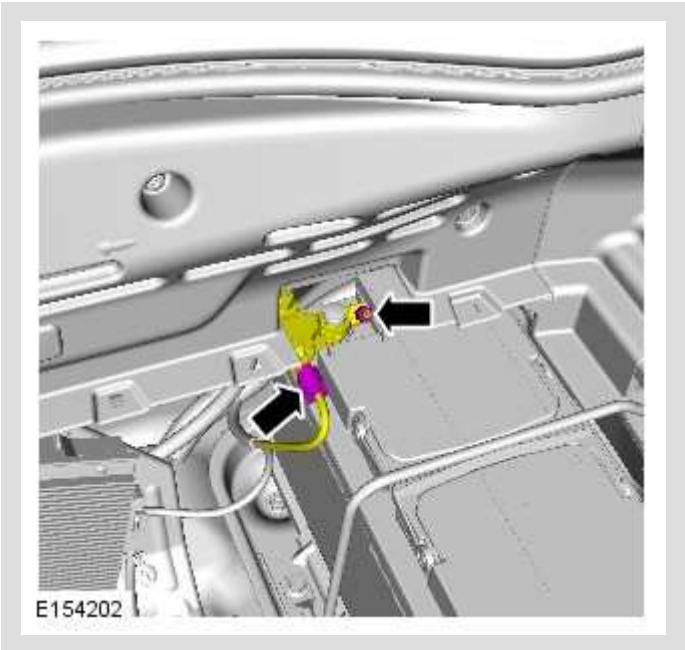
cardiagn.com



6.

CAUTION:

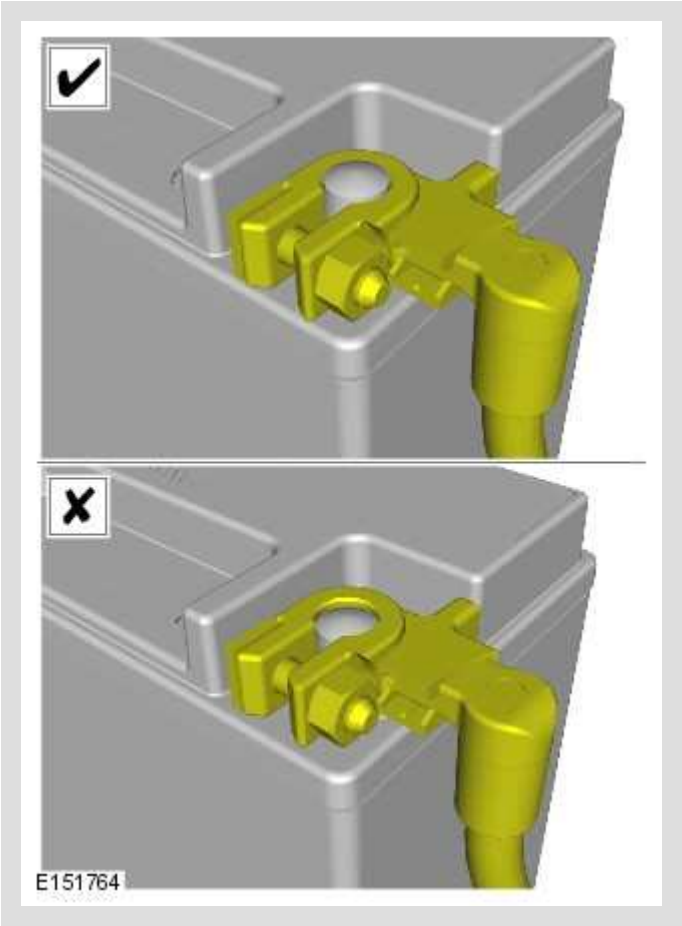
Take extra care not to damage the wiring harnesses.



cardiagn.com

Torque: **6 Nm**

7.



8. To install, reverse the removal procedure.

9.

NOTE:

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

ENGINE - V6 S/C 3.0L PETROL

OIL PAN EXTENSION (G1774731)

REMOVAL AND INSTALLATION

12.60.48	OIL PAN BODY ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	13	USED WITHINS	

SPECIAL TOOL(S)

303-1433

Lower Timing Cover Alignment tool

cardiagn.com

E115256

303-1437

Crankshaft Damper Remover/Installer

E115257

303-1438

Crankshaft Damper Bolt Remover/Installer

E115258

303-1439

Crankshaft Damper Removal Plate

E115259

303-1440

Crankshaft Damper Removal/Installation Stud

cardiagn.com

E115260	**303-1441** Crankshaft Damper Remover/Installer Body

E152576	**JLR-303-1304** Locking Tool

REMOVAL

All vehicles

WARNING:

This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.

NOTES:

cardiagn.com

- Some components shown removed for clarity.
- Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

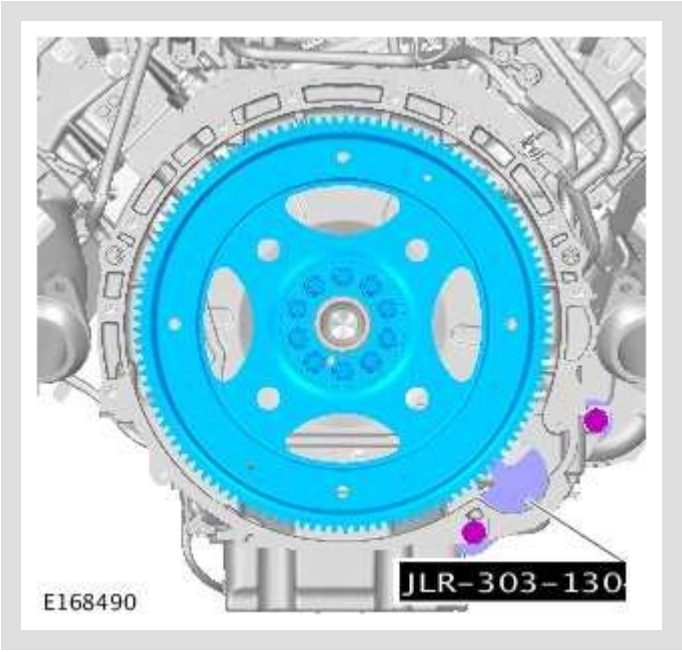
3. Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

4. Refer to: Engine (303-01A Engine - V6 S/C 3.0L Petrol, Removal).

Vehicles with automatic transmission

1.

cardiagn.com



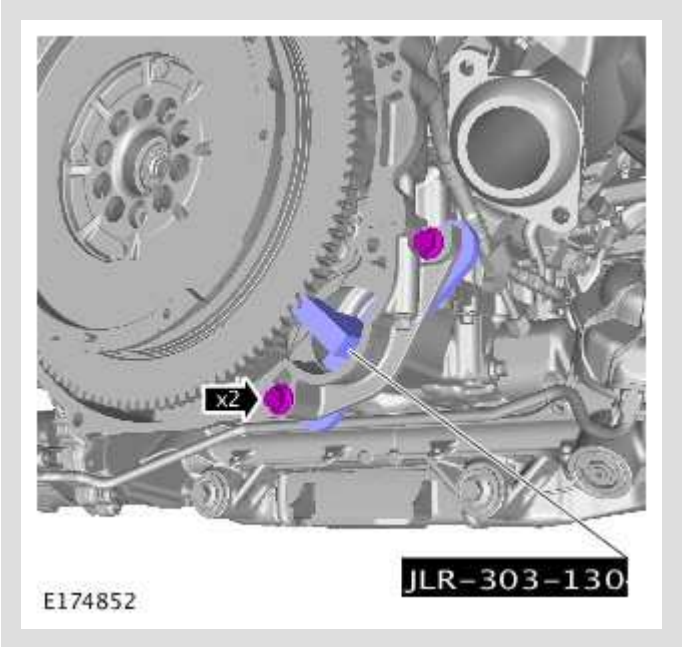
Install the special tool.

Special Tool(s): JLR-303-1304

	Vehicles with manual transmission

1.

cardiagn.com



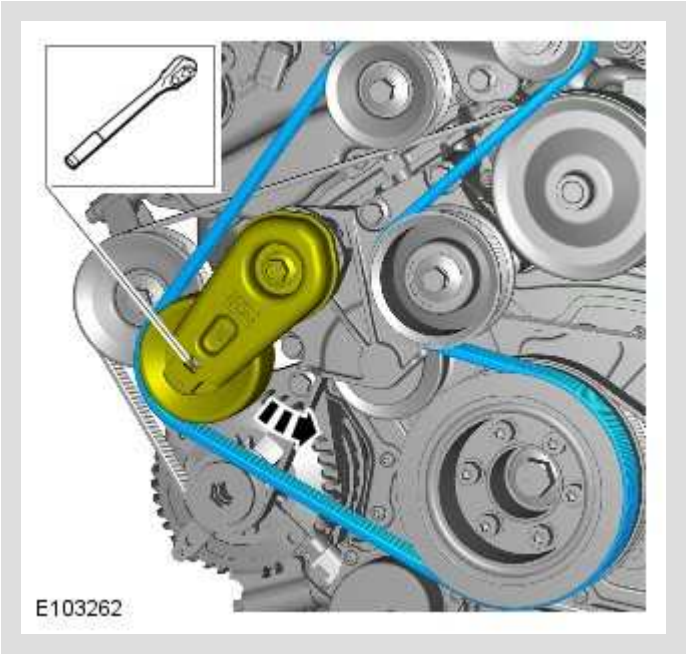
Install the special tool.

Special Tool(s): JLR-303-1304

All vehicles

1.

cardiagn.com

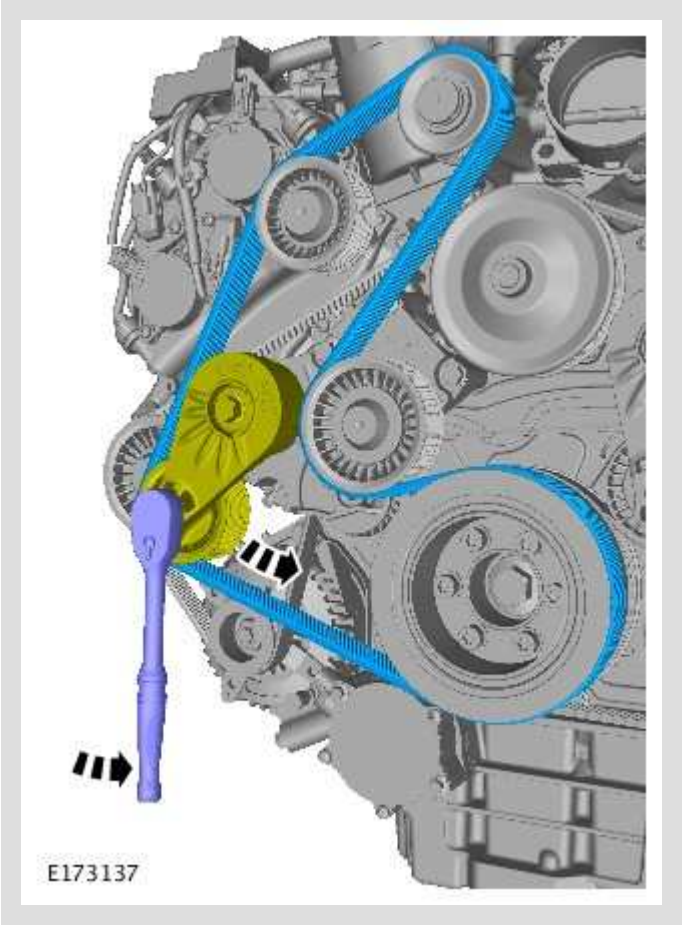


2.

NOTE:

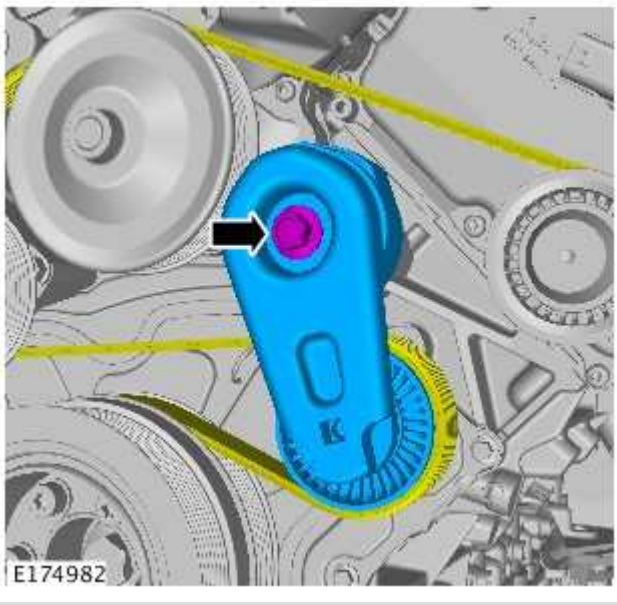
If equipped.

cardiagn.com



3.

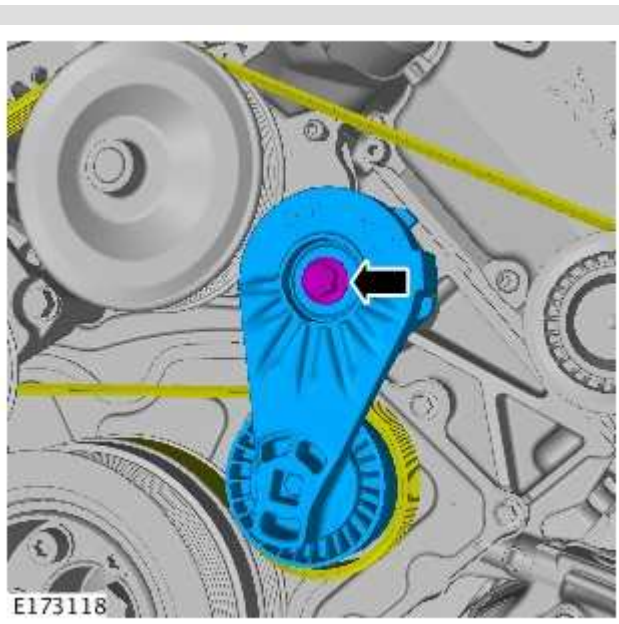
cardiagn.com



4.

NOTE:

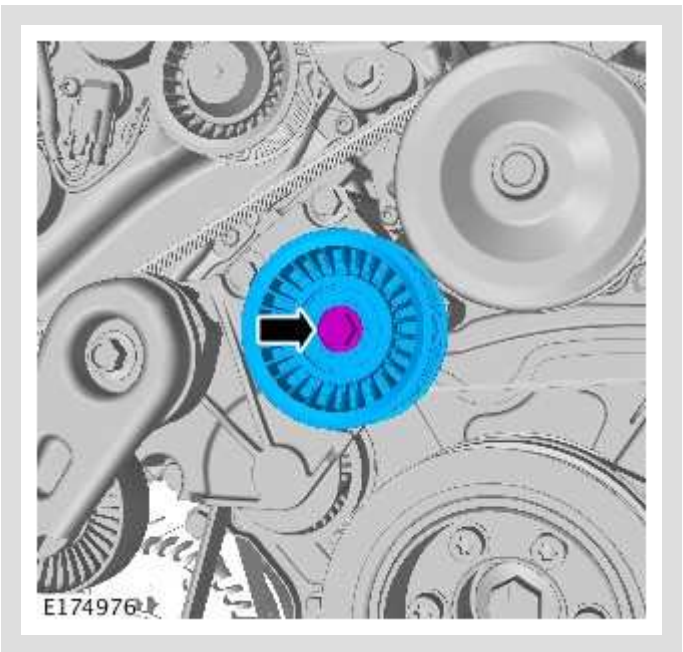
If equipped.



5.

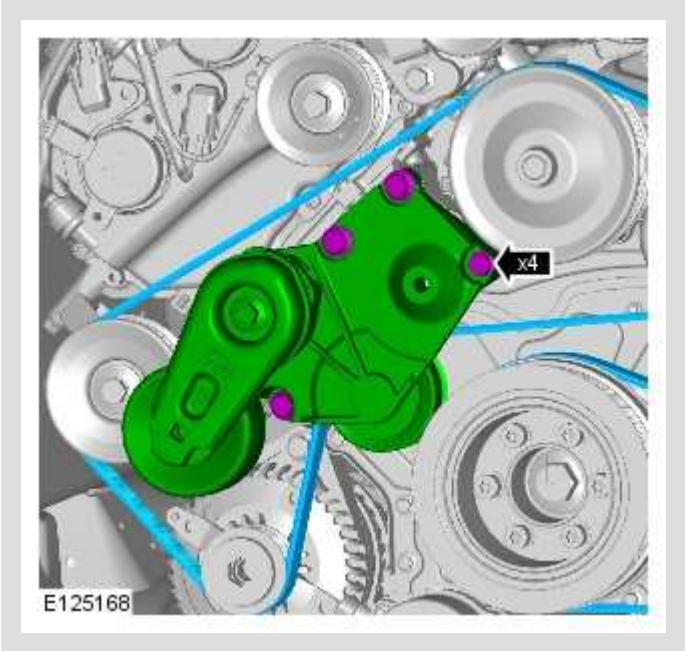
cardiagn.com

6.



7.

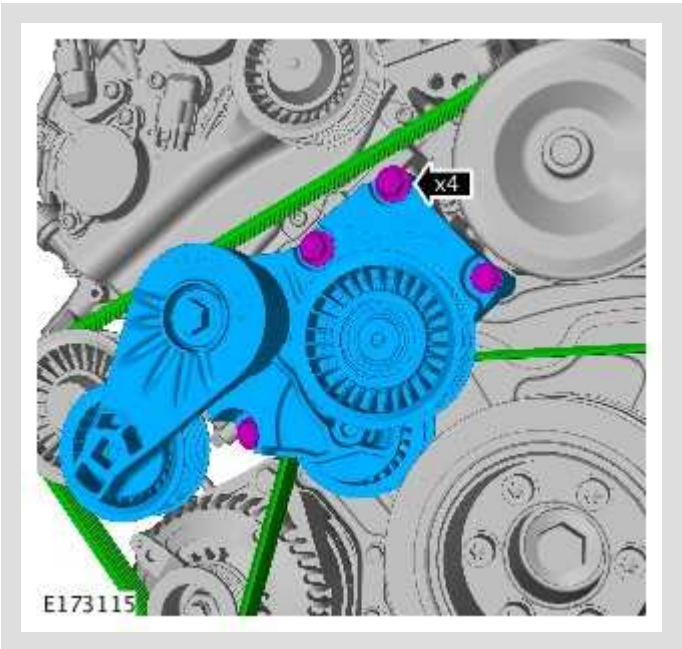
cardiagn.com



8.

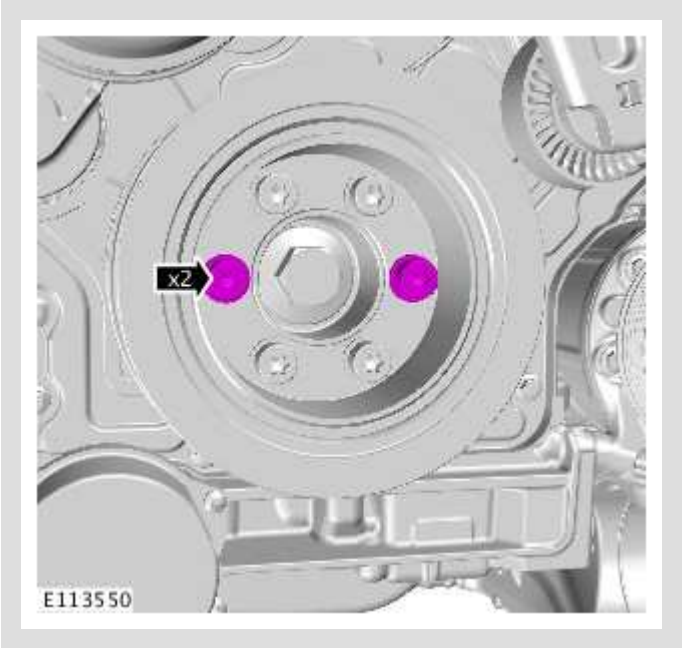
NOTE:

If equipped.

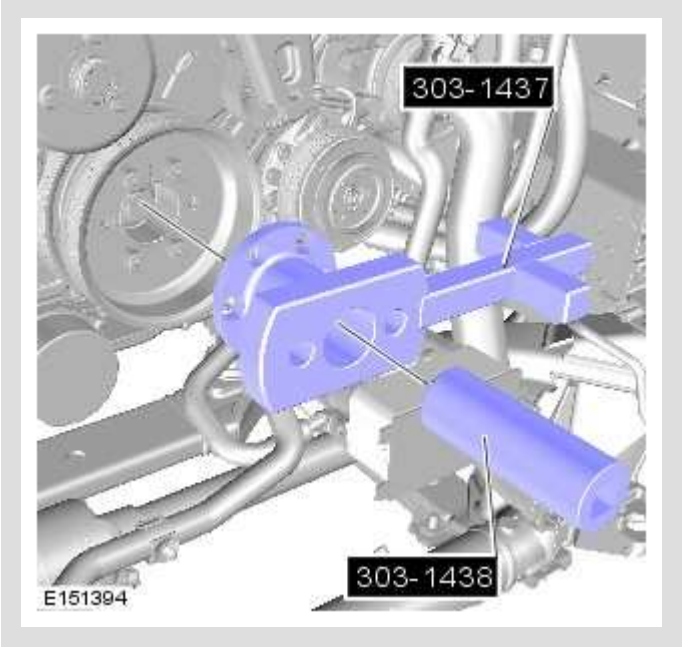


cardiagn.com

9.



10.

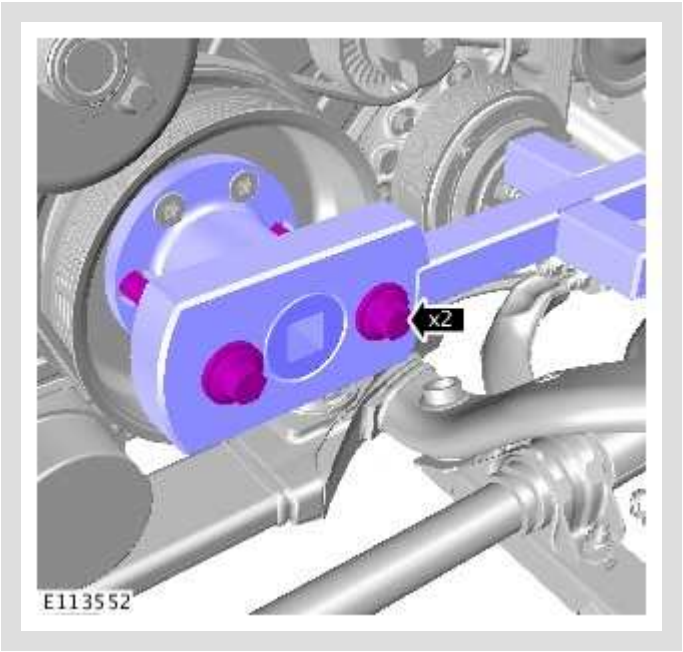


Install the special tool.

Special Tool(s): 303-1438 , 303-1437

11.

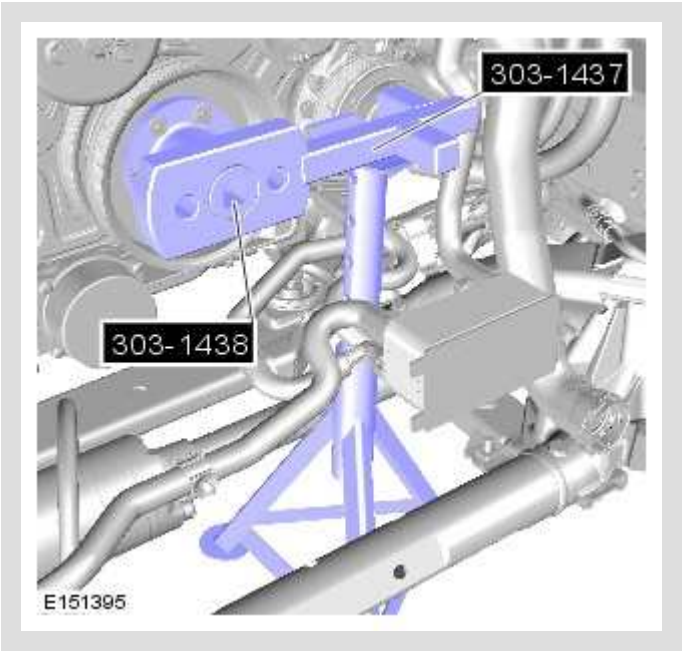
cardiagn.com



Special Tool(s): 303-1438 , 303-1437

Torque: **25 Nm**

12.



Support the special tool using a suitable vehicle stand.

Special Tool(s): 303-1438 , 303-1437

cardiagn.com

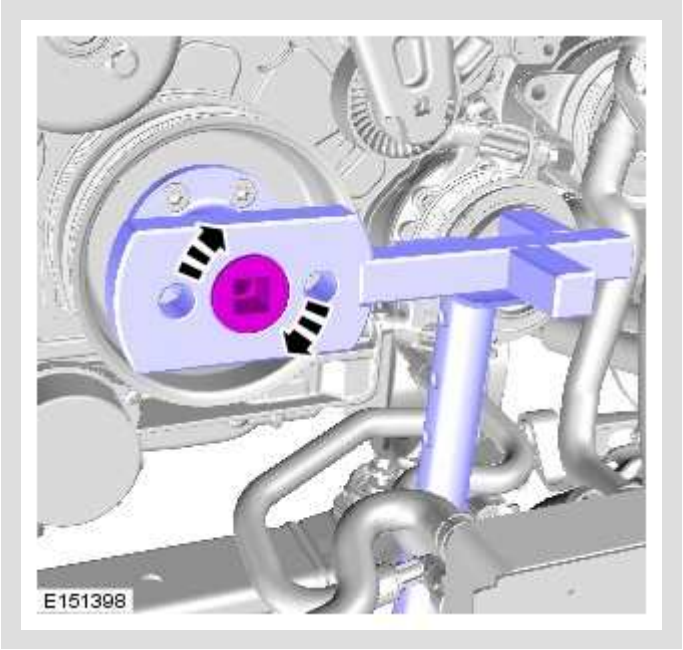
13.

CAUTION:

The crankshaft pulley bolt must be removed clockwise. Failure to follow this instruction may result in damage to the crankshaft.

NOTE:

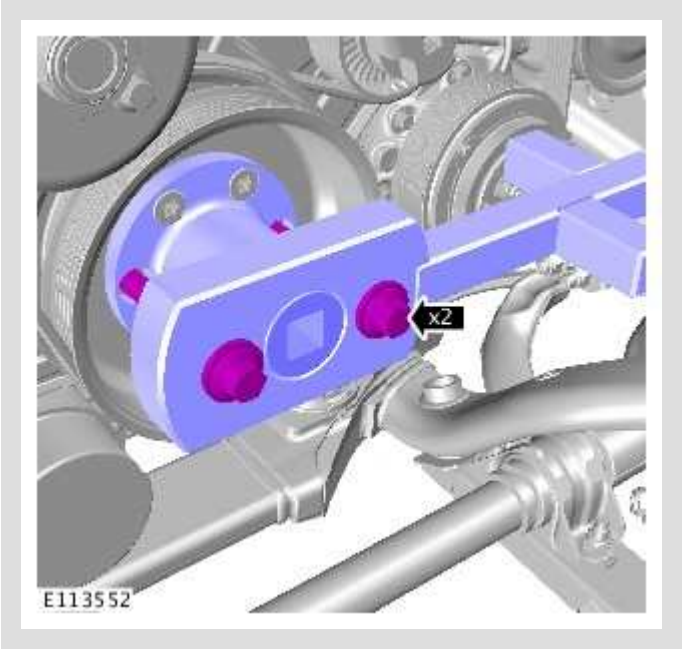
The crankshaft pulley bolt will be very tight.



Special Tool(s): 303-1438 , 303-1437

14.

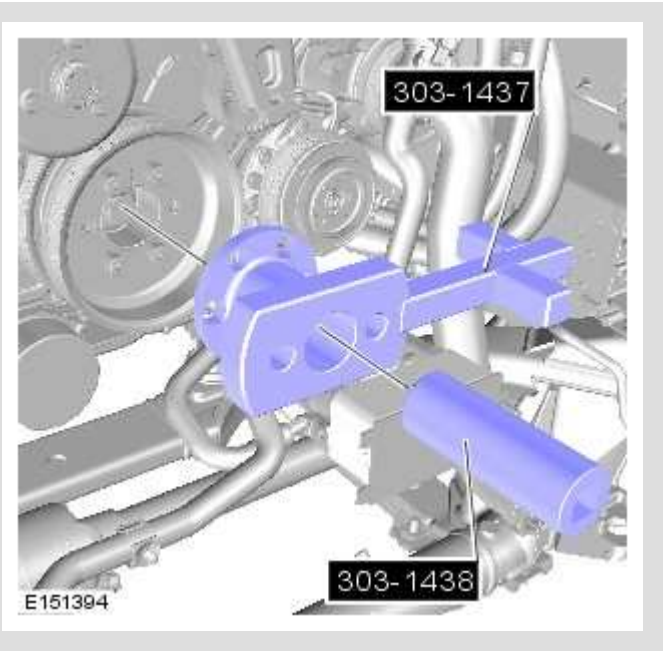
cardiagn.com



Special Tool(s): 303-1438 , 303-1437

15.

cardiagn.com



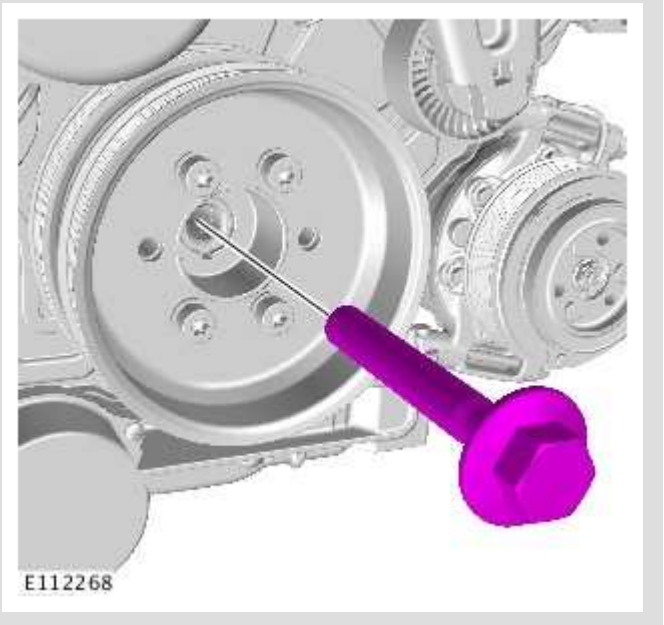
Remove the special tools.

Special Tool(s): 303-1438 , 303-1437

16.

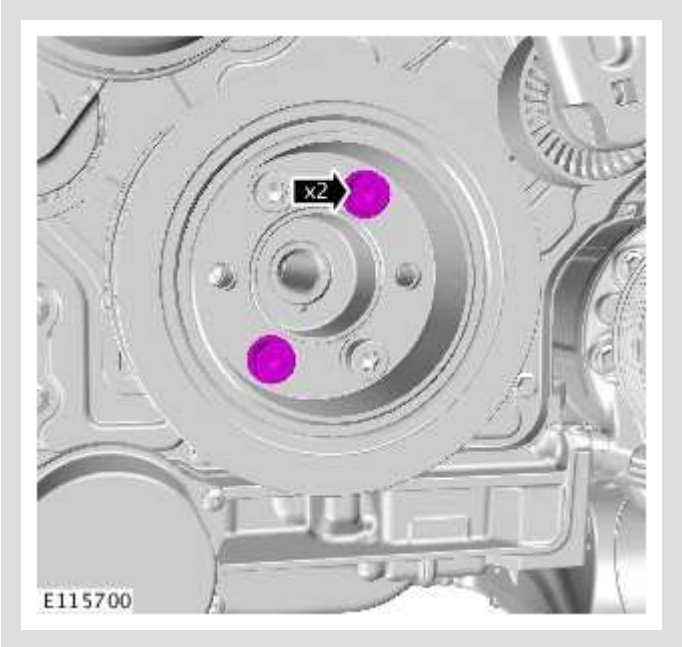
NOTE:

Discard the bolt after removal.

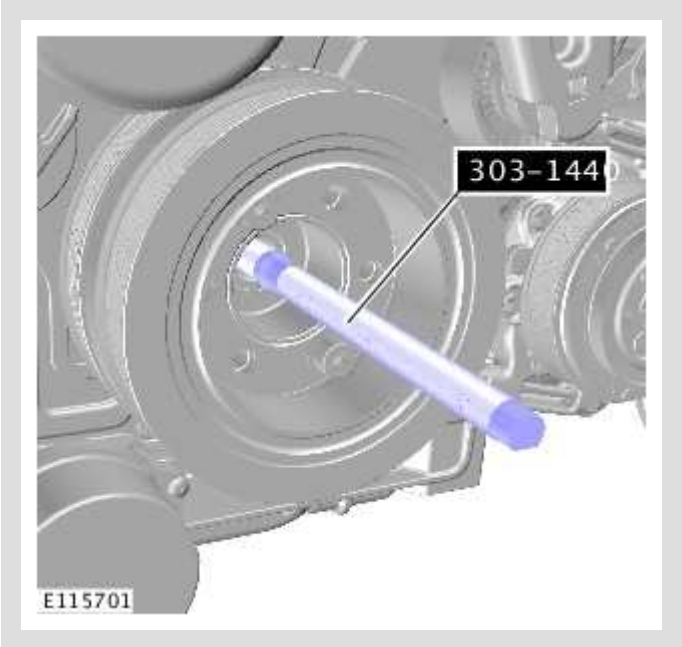


17.

cardiagn.com



18.

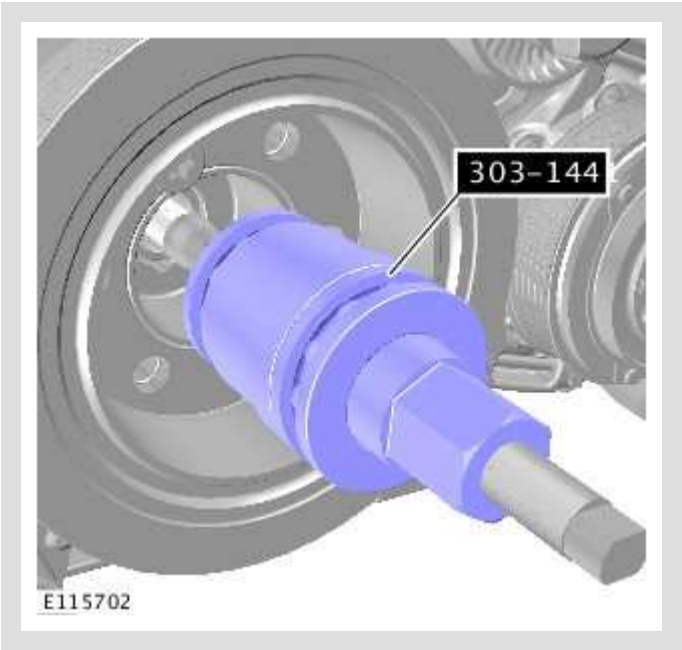


Install the special tool.

Special Tool(s): 303-1440

19.

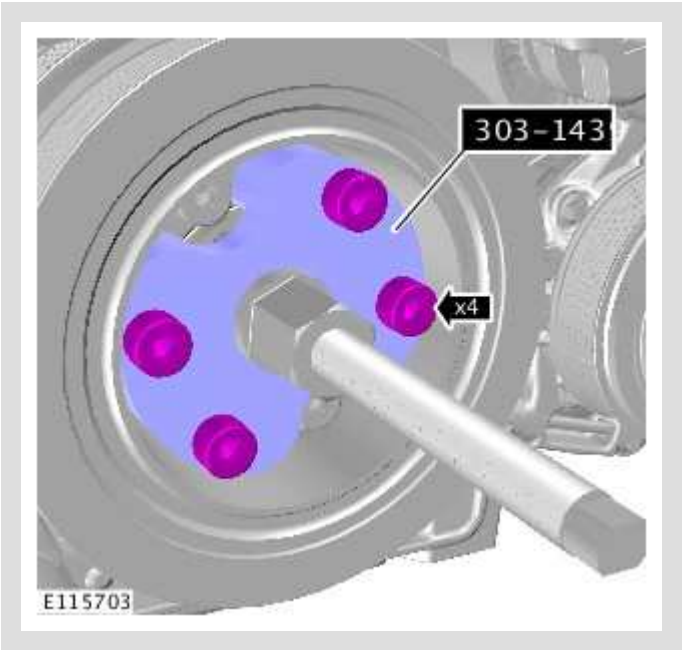
cardiagn.com



Install the special tool.

Special Tool(s): 303-1441

20.



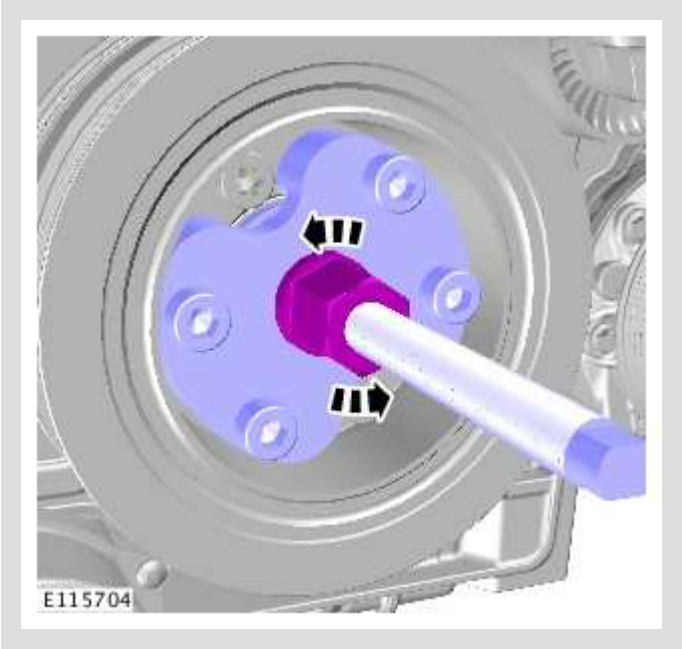
Install the special tool.

Special Tool(s): 303-1439

Torque: **25 Nm**

21.

cardiagn.com



Special Tool(s): 303-1439 , 303-1440

22.

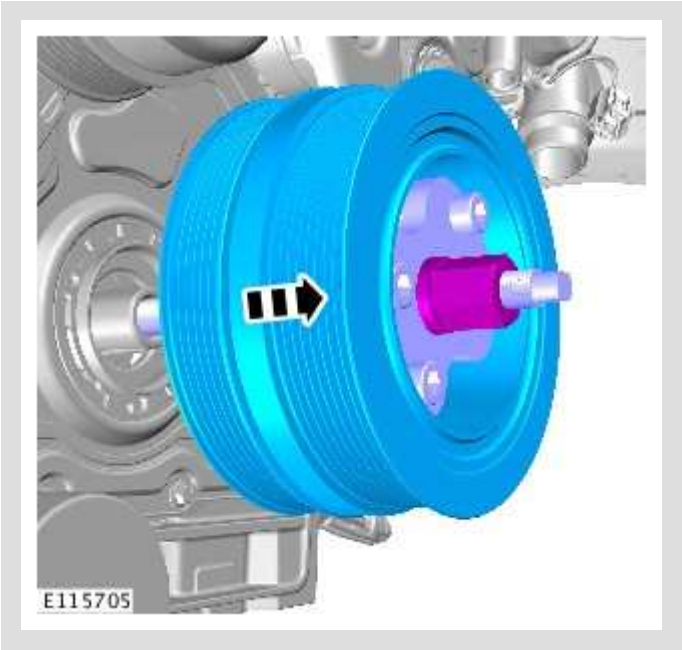
CAUTION:

Discard the friction washer after removing the crankshaft pulley.

NOTE:

Make sure to clean the threads in the end of the crankshaft and that the crank nose is free of any foreign materials.

cardiagn.com



23.

Special Tool(s): 303-1439

cardiagn.com

24.

Special Tool(s): 303-1440 , 303-1441

Vehicles with automatic transmission

1.

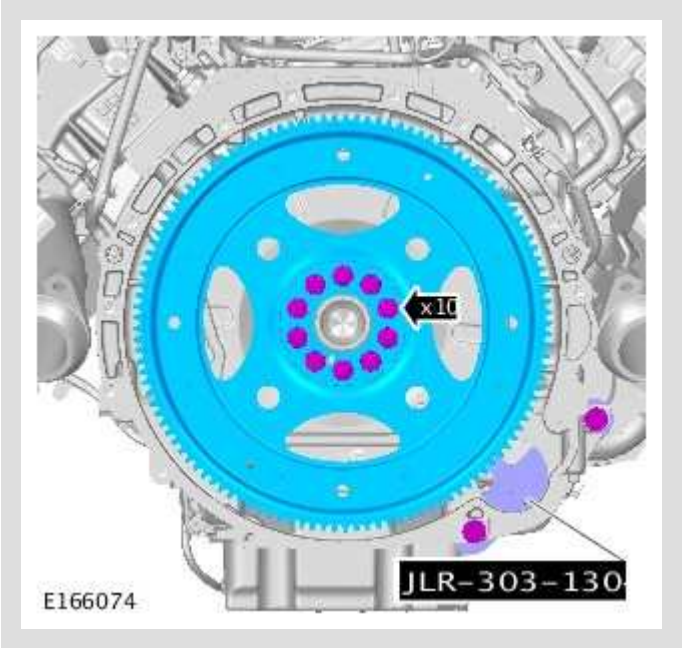
CAUTIONS:

- The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
- Make sure that no components fall off during removal.

NOTE:

Make sure that the crankshaft is not rotated.

cardiagn.com



Special Tool(s): JLR-303-1304

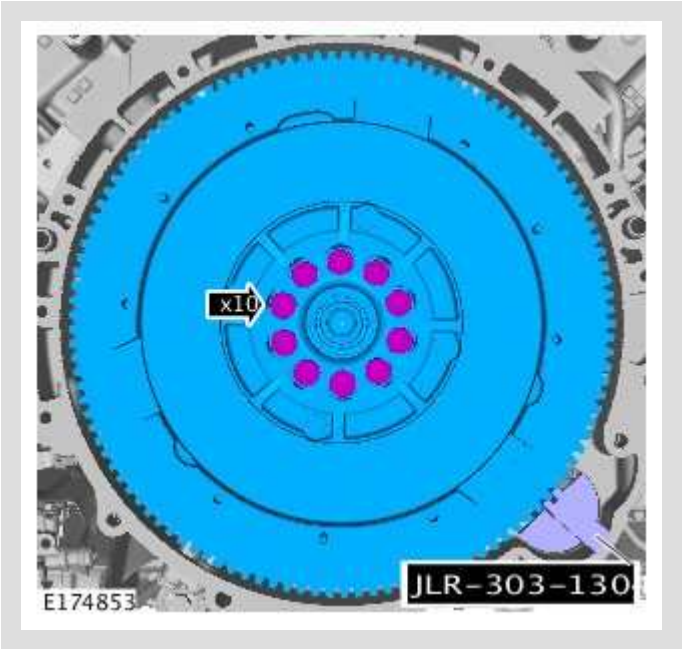
Vehicles with manual transmission

1.

CAUTION:

Discard the bolts

cardiagn.com

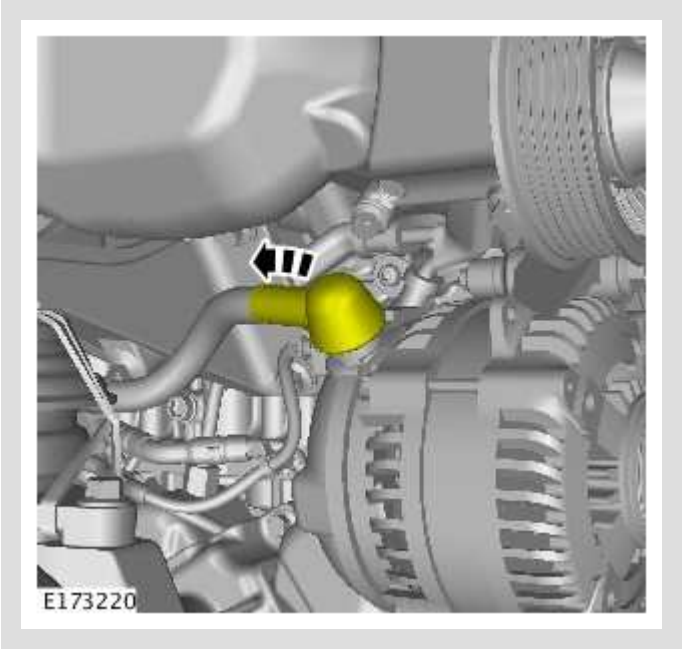


Special Tool(s): JLR-303-1304

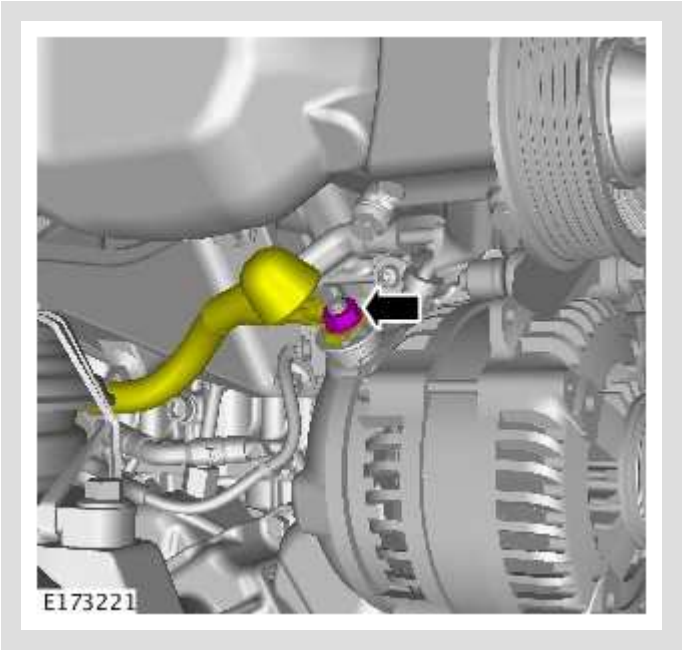
All vehicles

1.

cardiagn.com

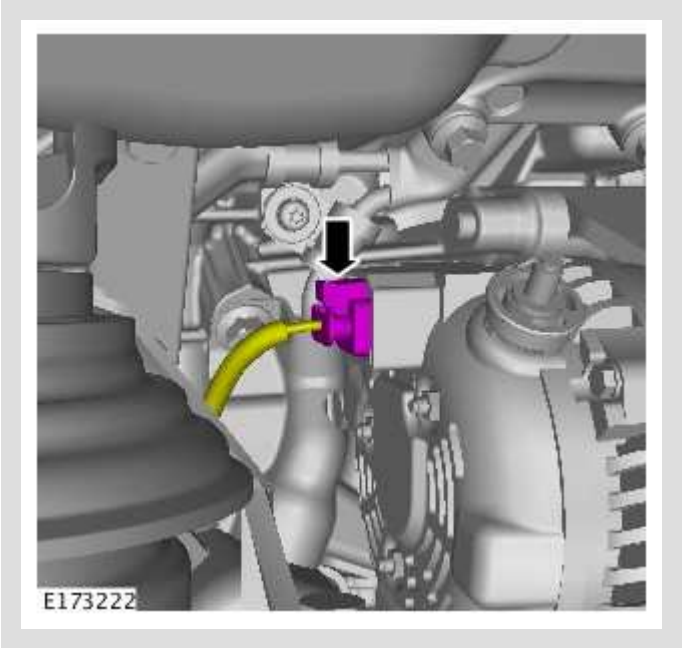


2.

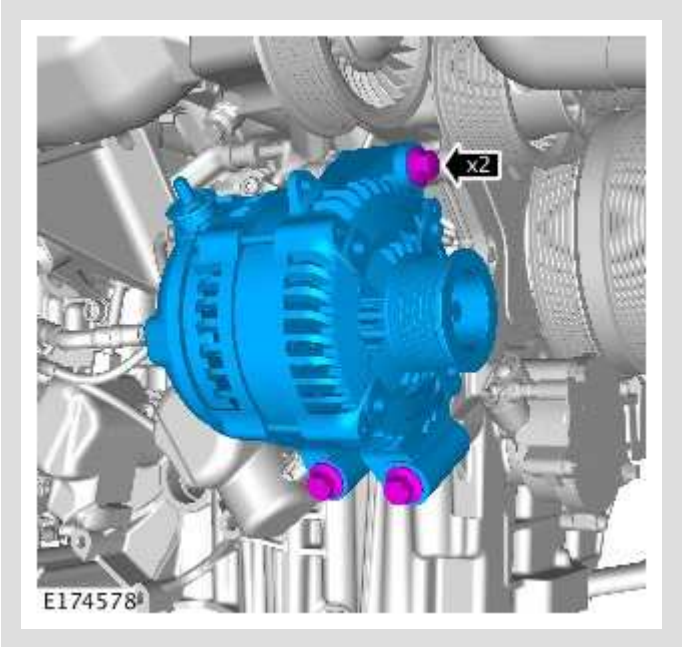


cardiagn.com

3.

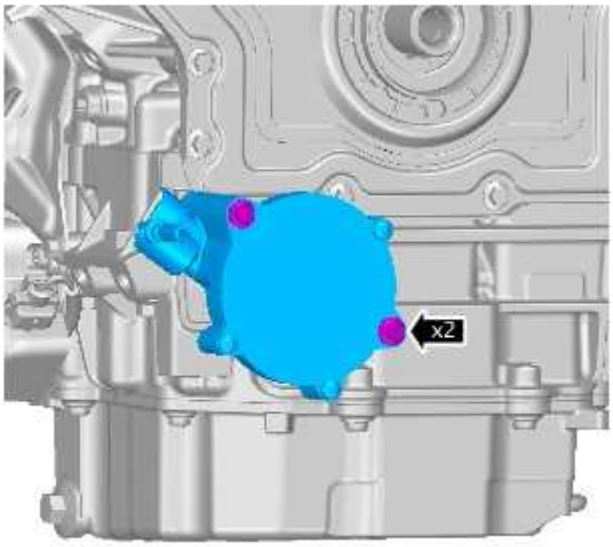


4.



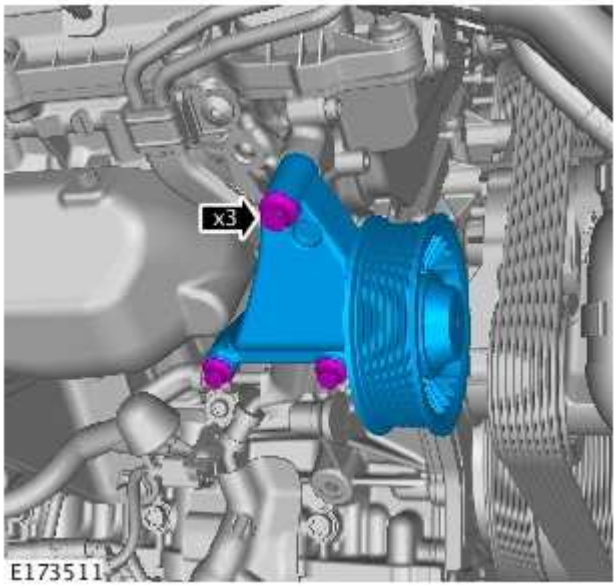
5.

cardiagn.com



E165937

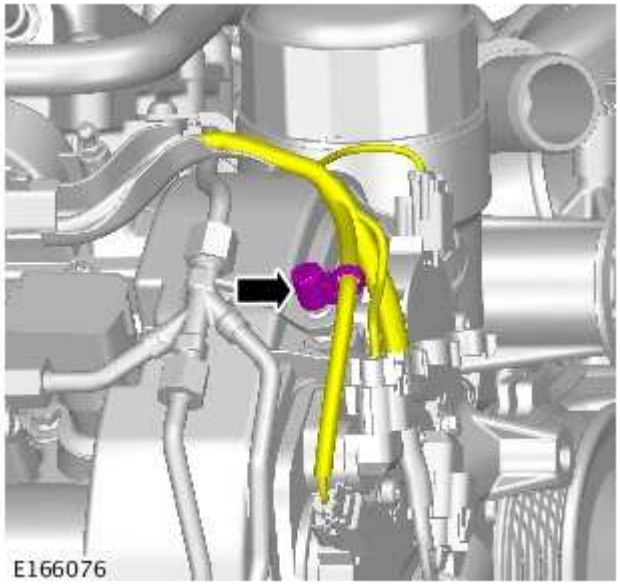
6.



E173511

cardiagn.com

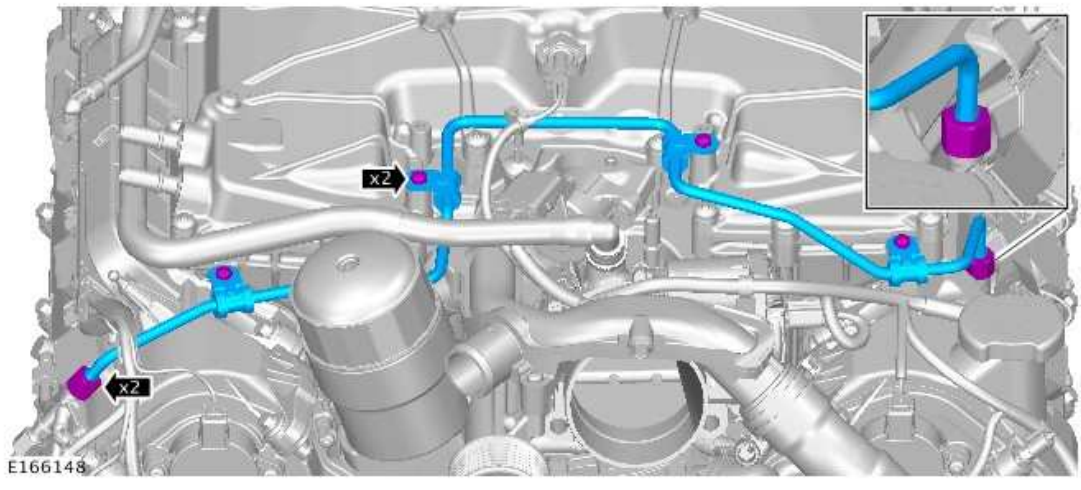
7.



8.

CAUTIONS:

- Be prepared to collect escaping fuel.
- This fuel pipe can be re-used, inspect for signs of damage. Renew if necessary.
- Make sure that all openings are sealed. Use new blanking caps.

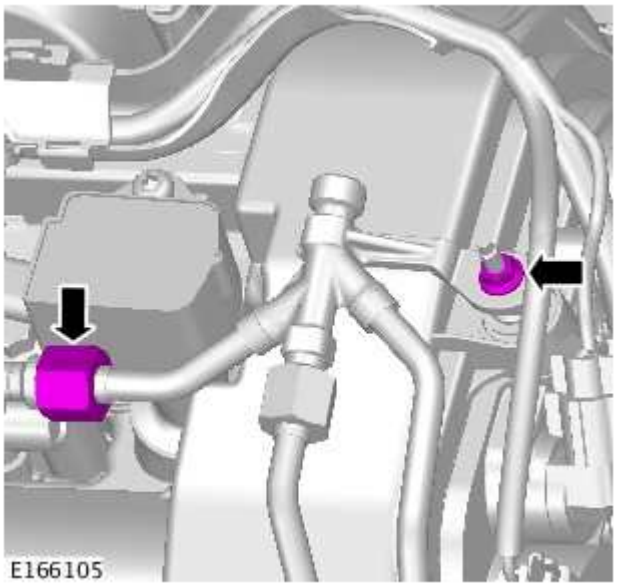


9.

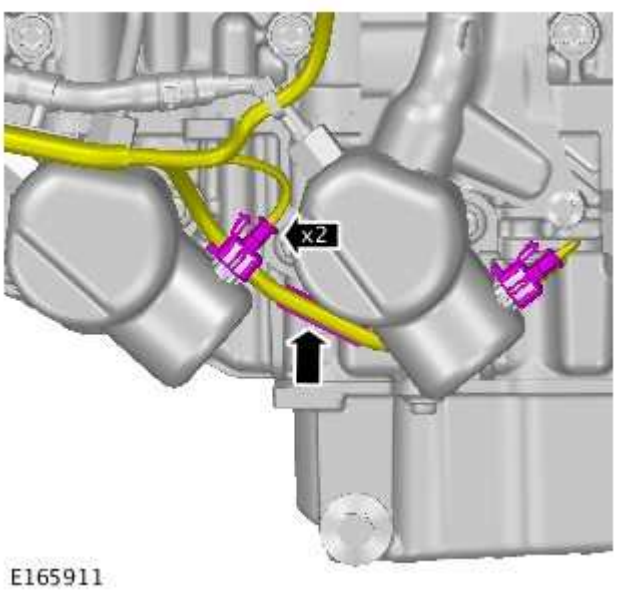
cardiagn.com

CAUTIONS:

- Be prepared to collect escaping fuel.
- Make sure that all openings are sealed. Use new blanking caps.

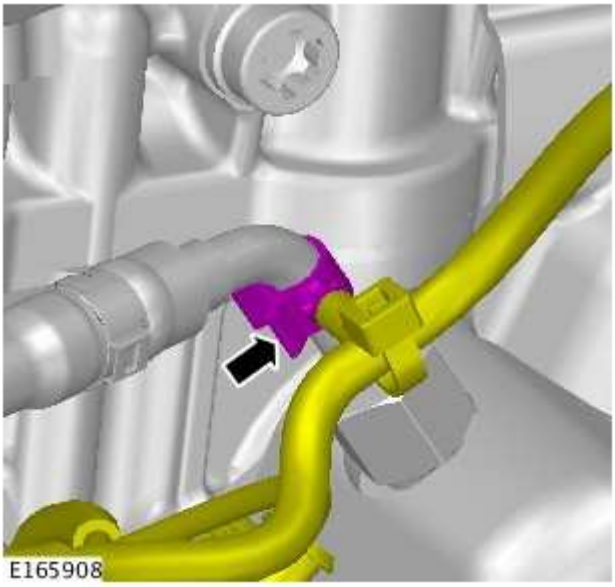


10.

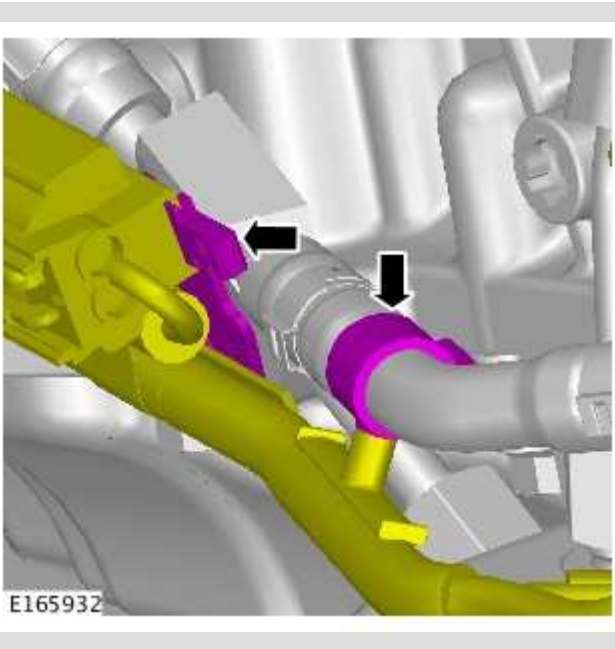


11.

cardiagn.com

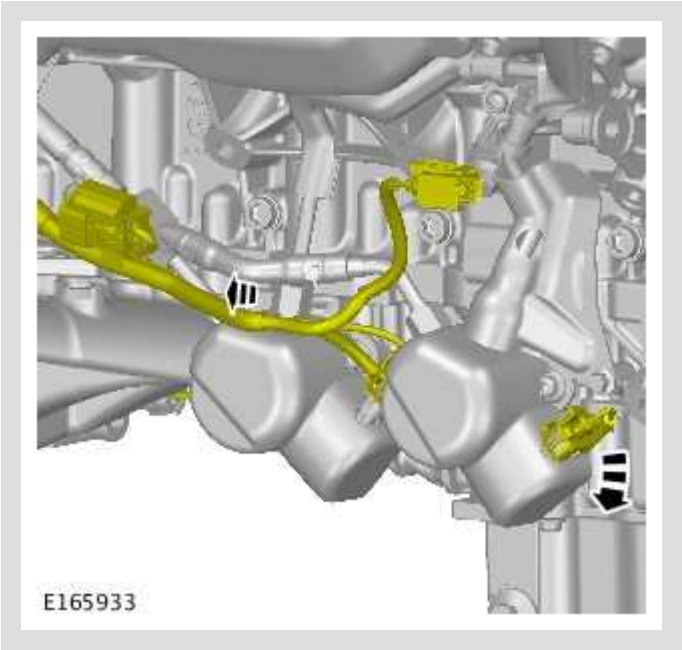


12.

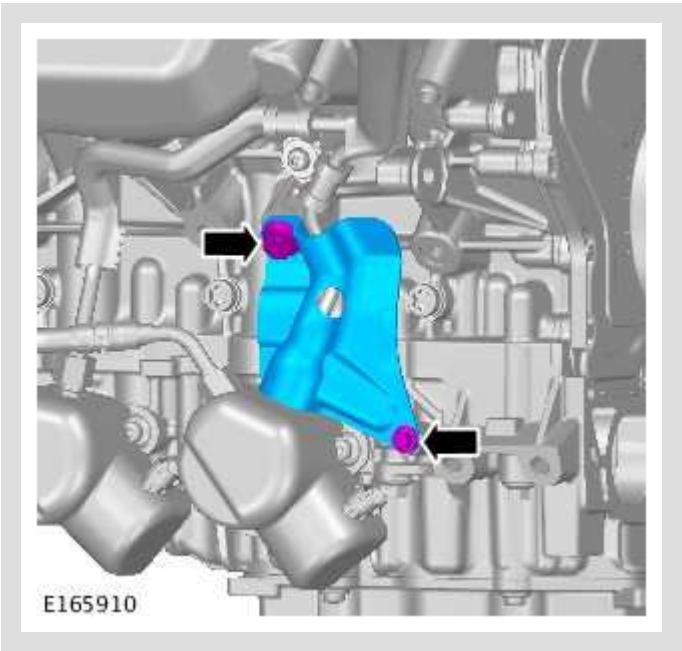


13.

cardiagn.com

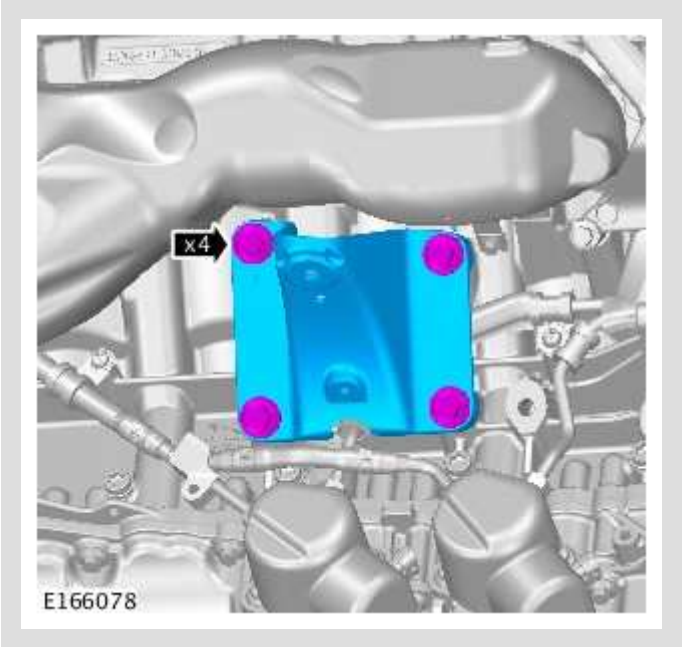


14.



15.

cardiagn.com

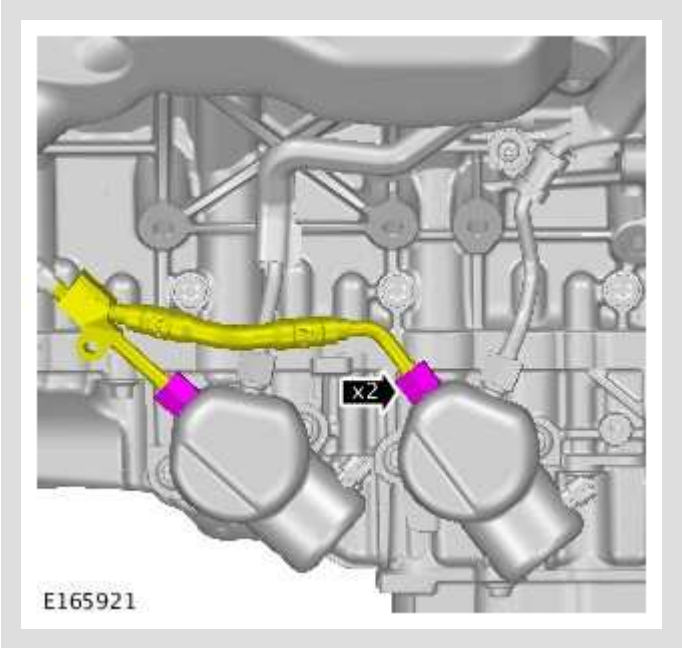


16.

CAUTIONS:

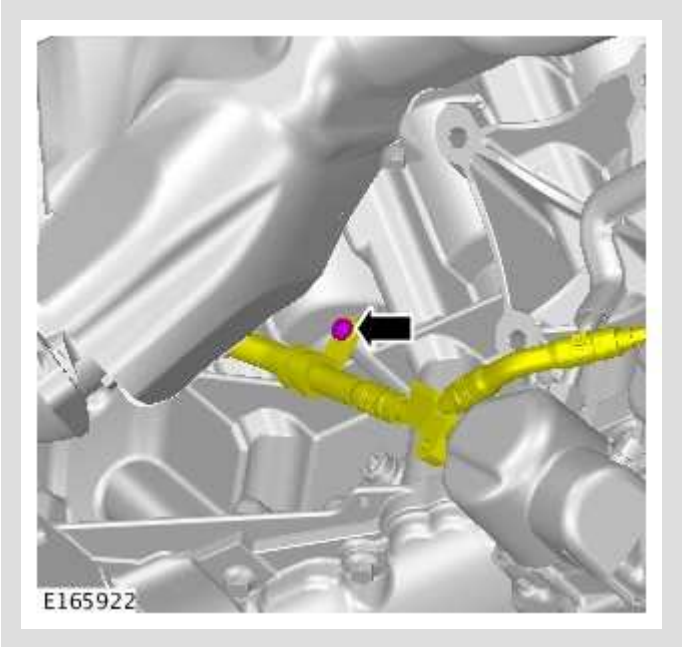
- Be prepared to collect escaping fuel.
- Make sure that all openings are sealed. Use new blanking caps.

cardiagn.com



17.

cardiagn.com

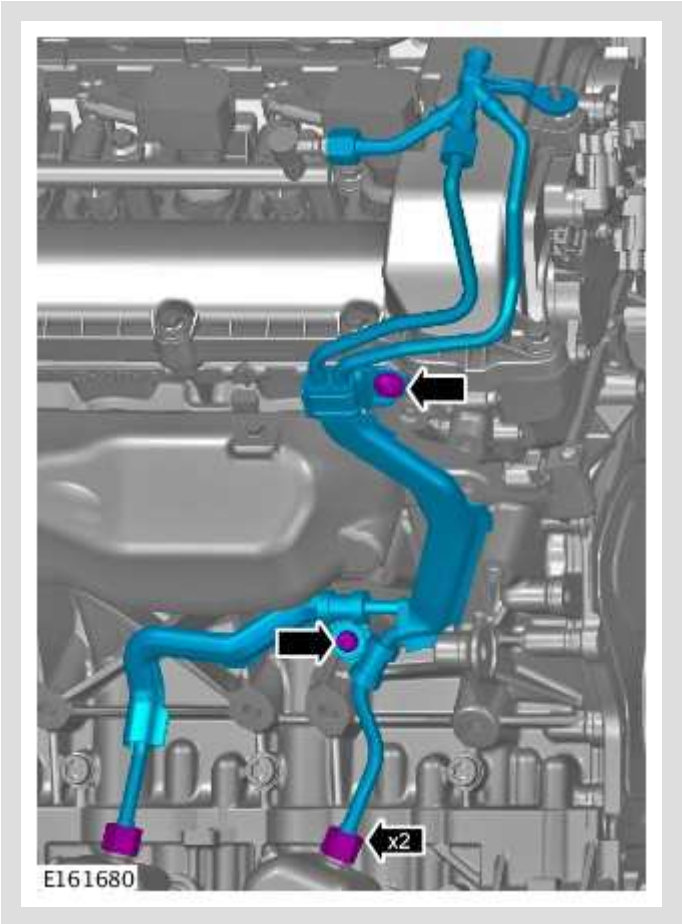


18.

CAUTIONS:

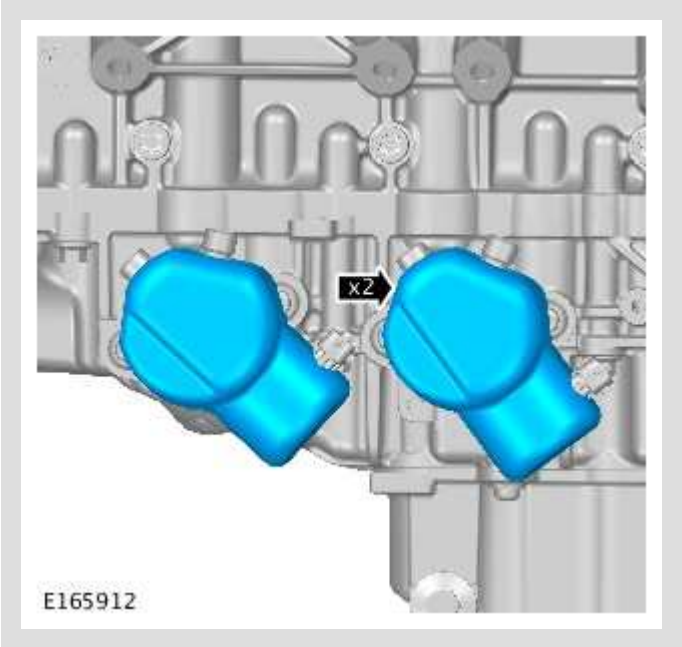
- Be prepared to collect escaping fuel.
- Make sure that all openings are sealed. Use new blanking caps.
- Remove and discard the high-pressure fuel supply lines.

cardiagn.com



19.

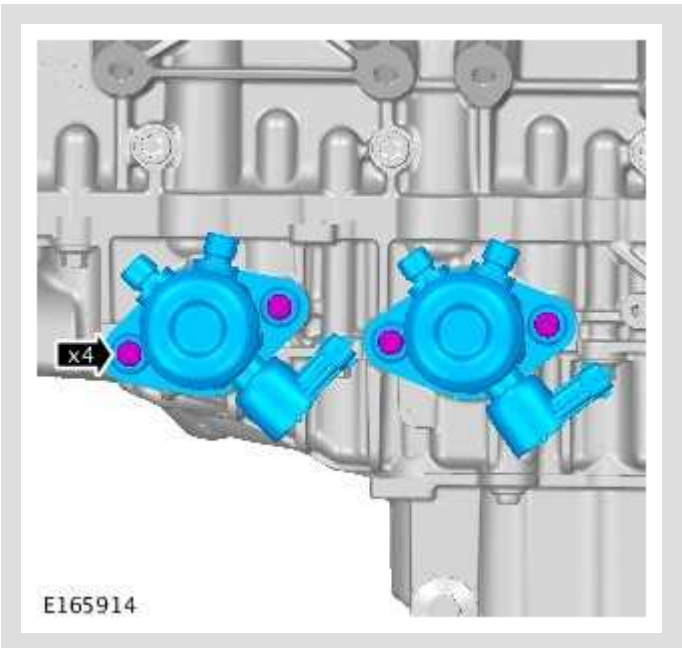
cardiagn.com



20.

CAUTION:

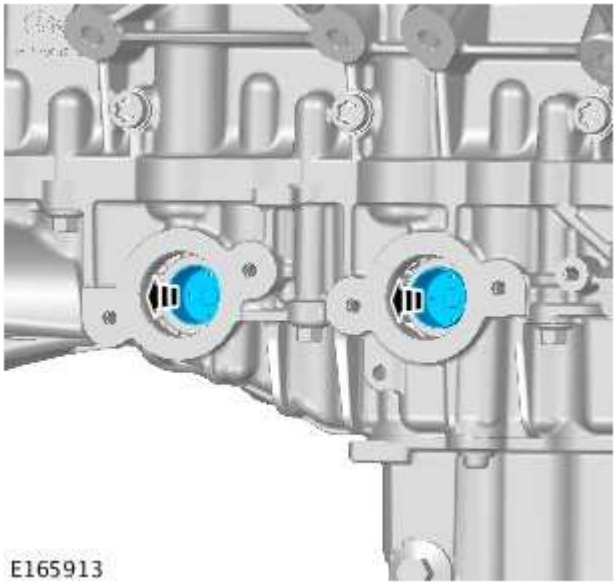
Be prepared to collect escaping oil.



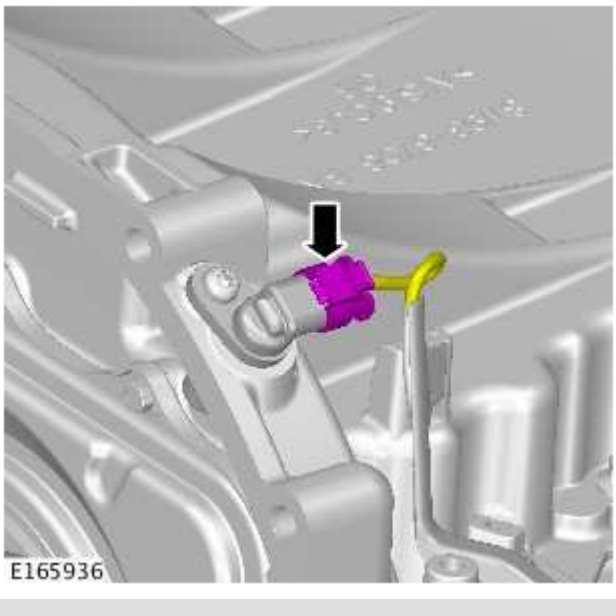
cardiagn.com

21. **CAUTION:**

Be prepared to collect escaping oil.

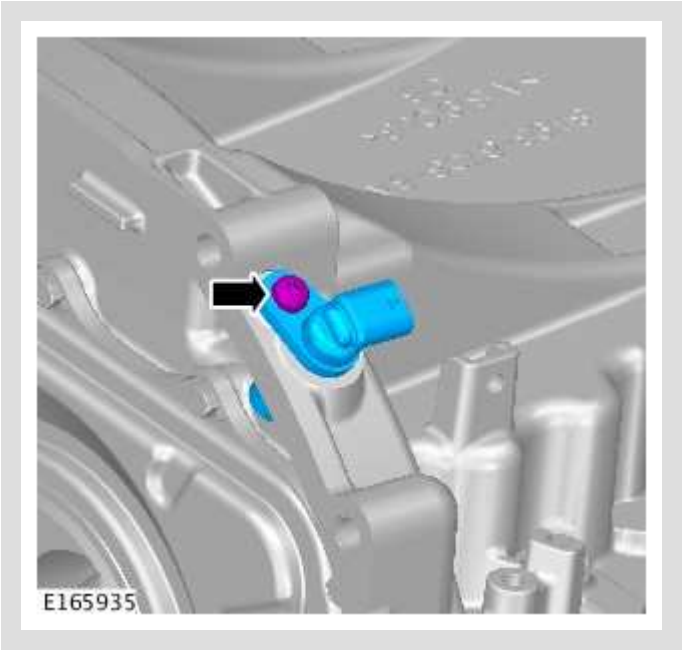


22.

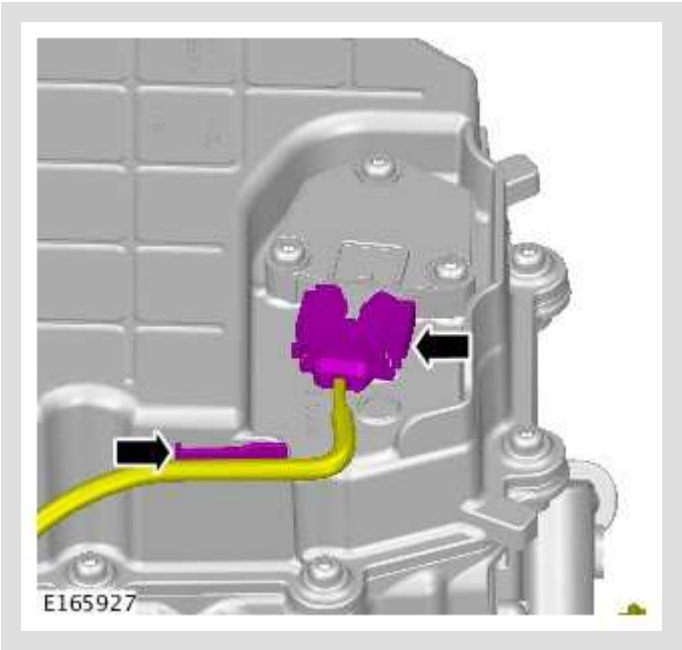


23.

cardiagn.com

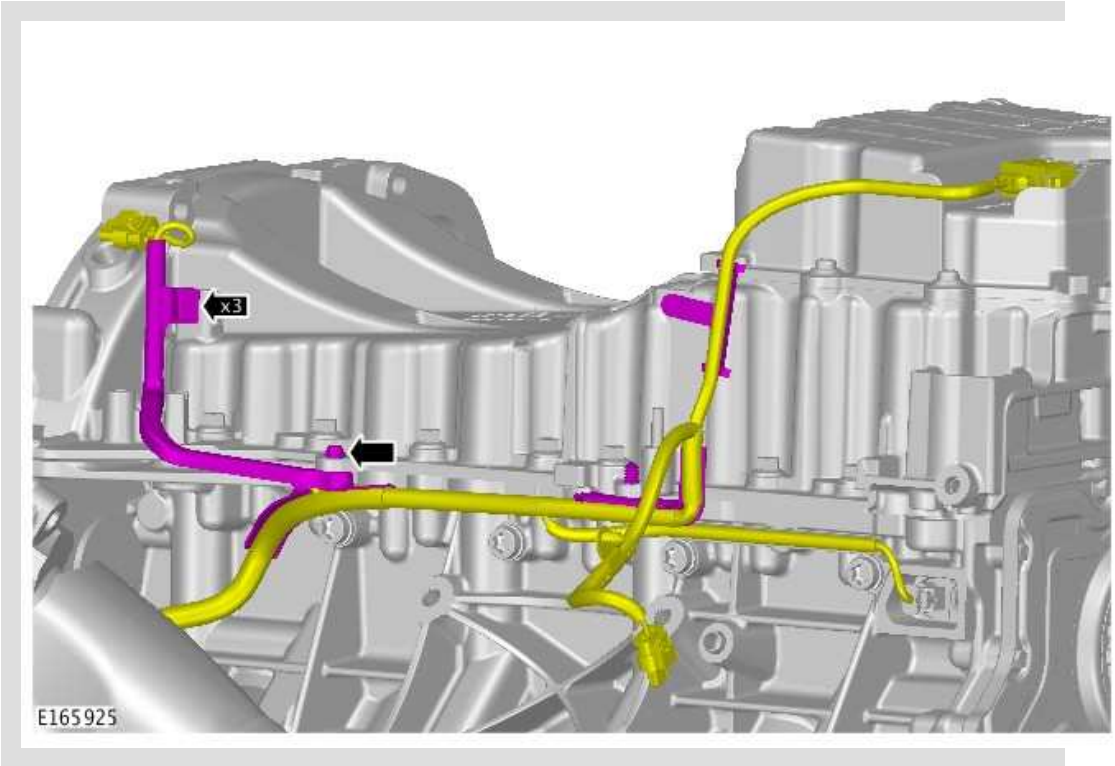


24.



25.

cardiagn.com

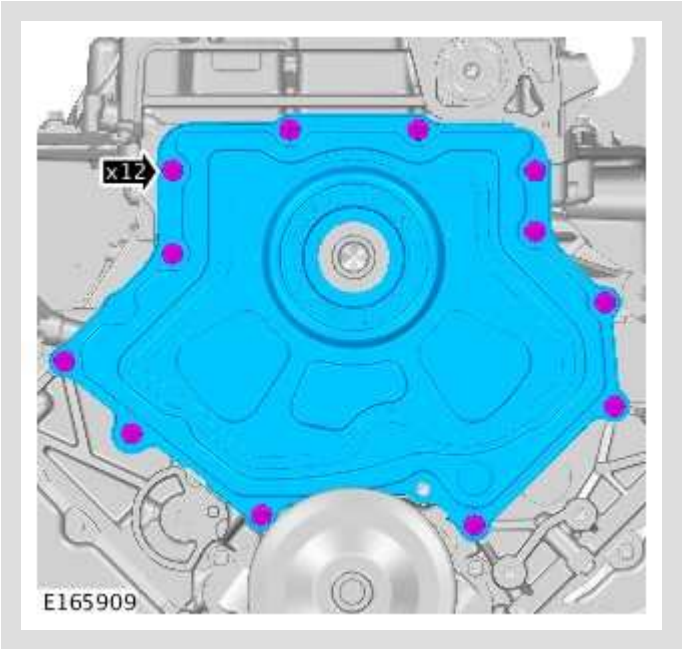


26.

CAUTION:

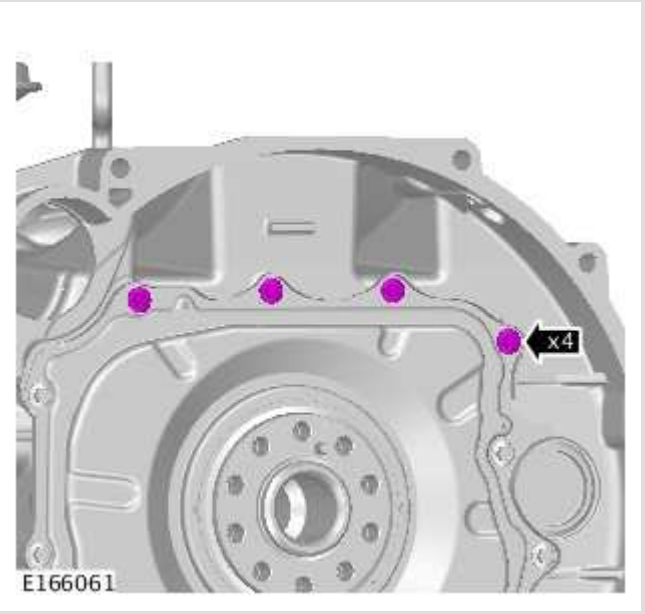
Discard the component.

cardiagn.com



27.

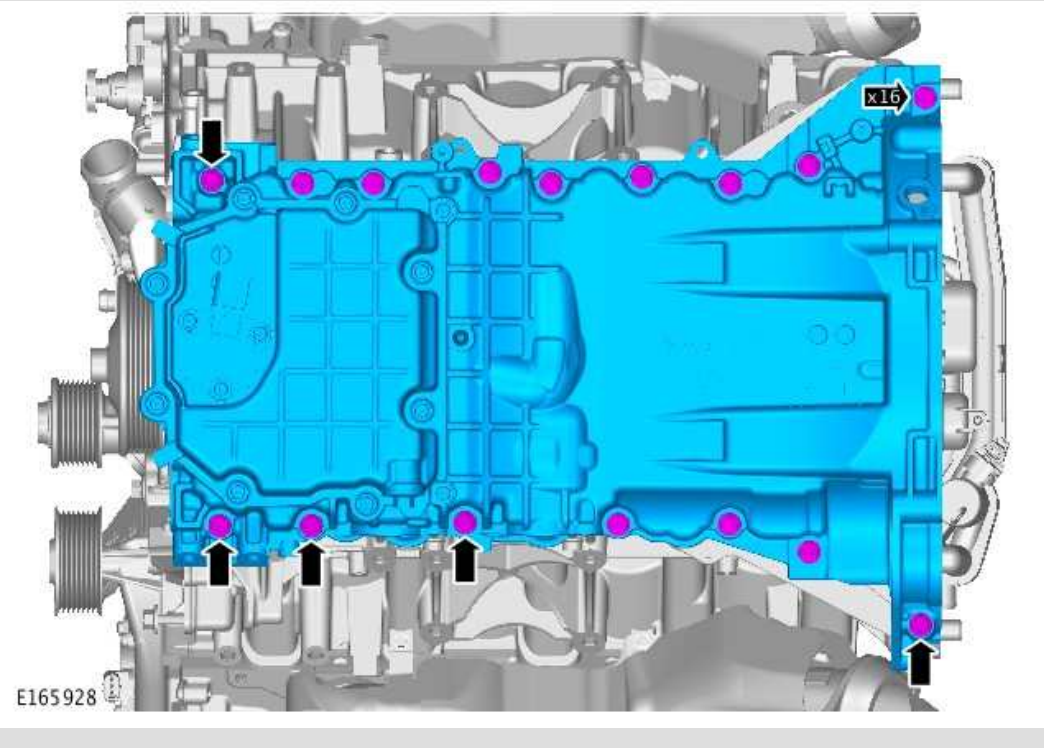
cardiagn.com



28.

CAUTION:

Note the position of the bolts indicated prior to removal.

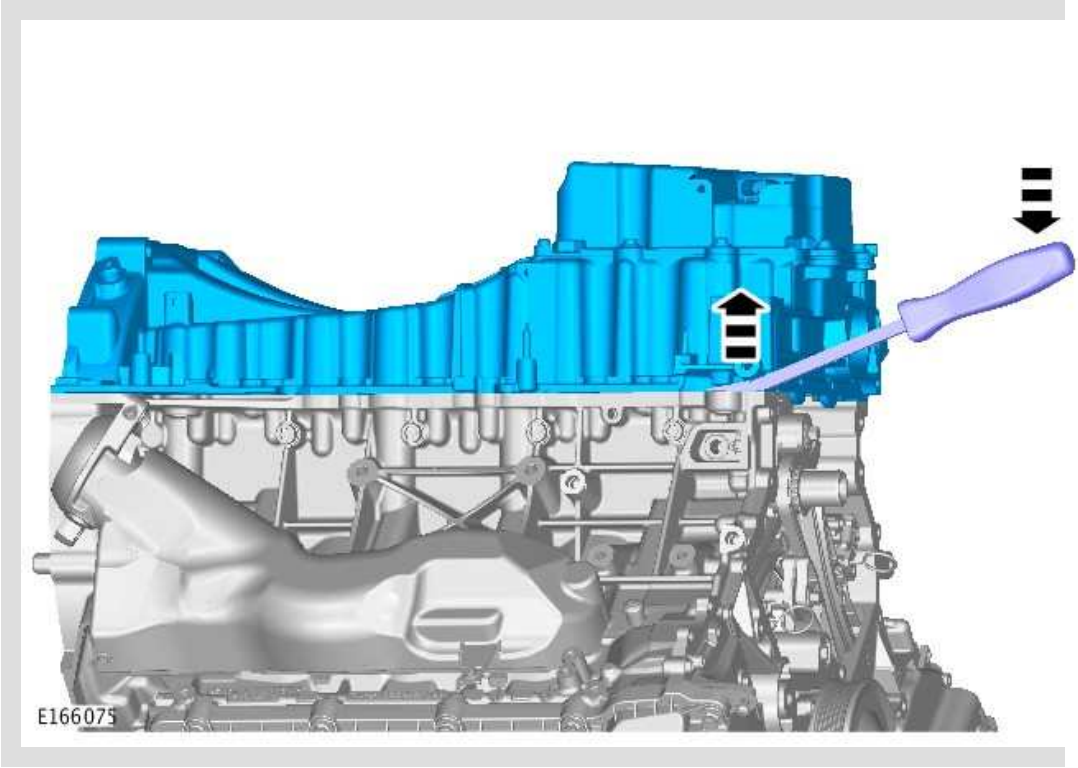


29.

NOTE:

cardiagn.com

Make sure to use the aluminium lug provided on the oil pan extension to lever against.



30.

NOTE:

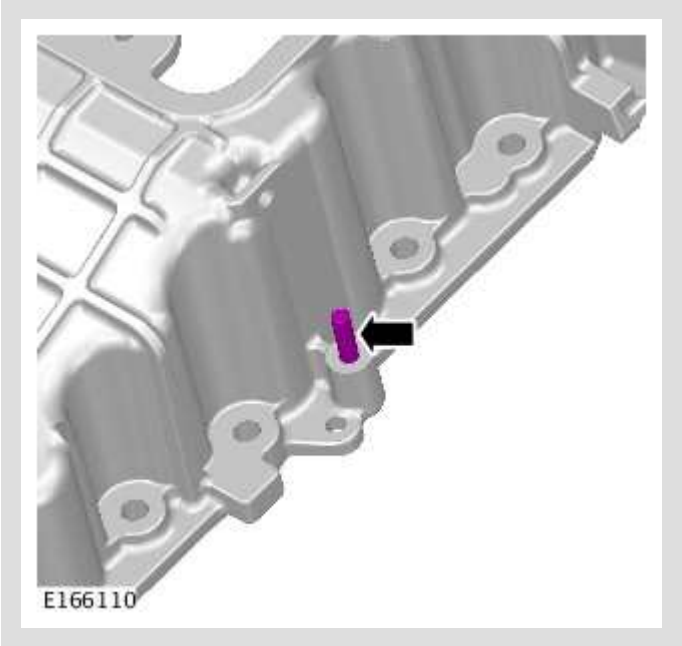
Do not disassemble further if the component is removed for access only.

cardiagn.com

31.

NOTE:

Do not disassemble further if the component is removed for access only.



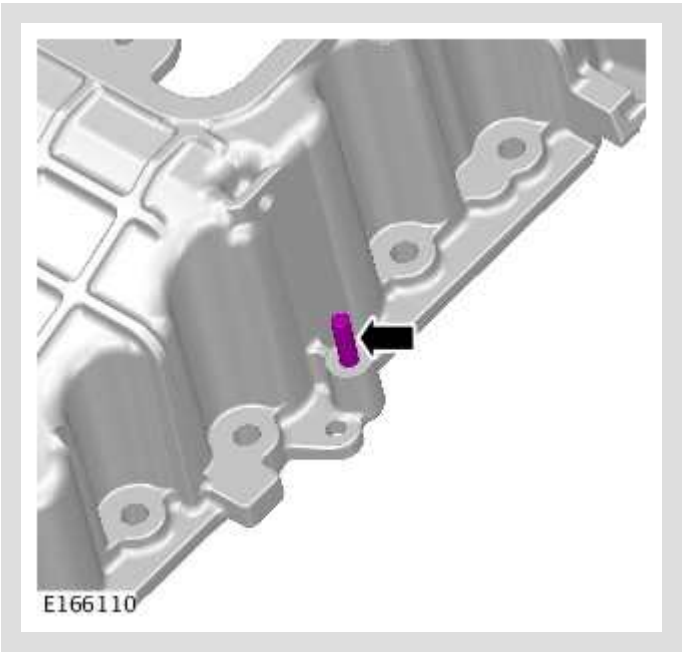
INSTALLATION

1.

NOTE:

cardiagn.com

This step is only necessary when installing a new oil pan extension.



Torque: **8 Nm**

2.

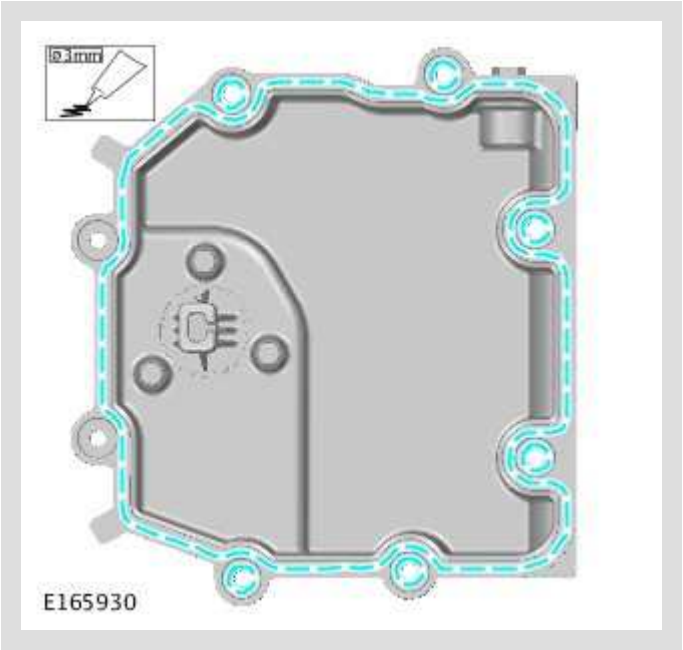
CAUTIONS:

- Make sure that the mating faces are clean and free of foreign material.
- Use only a plastic scraper when removing the sealing material.

NOTE:

This step is only necessary when installing a new oil pan extension.

cardiagn.com



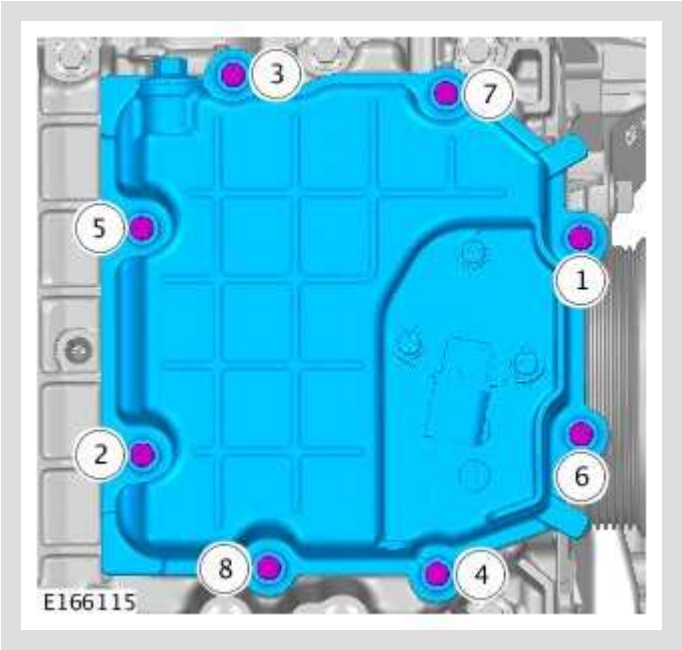
Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and install the oil pan within 7 minutes.

3.

NOTES:

- This step is only necessary when installing a new oil pan extension.
- Tighten the bolts in the indicated sequence.

cardiagn.com



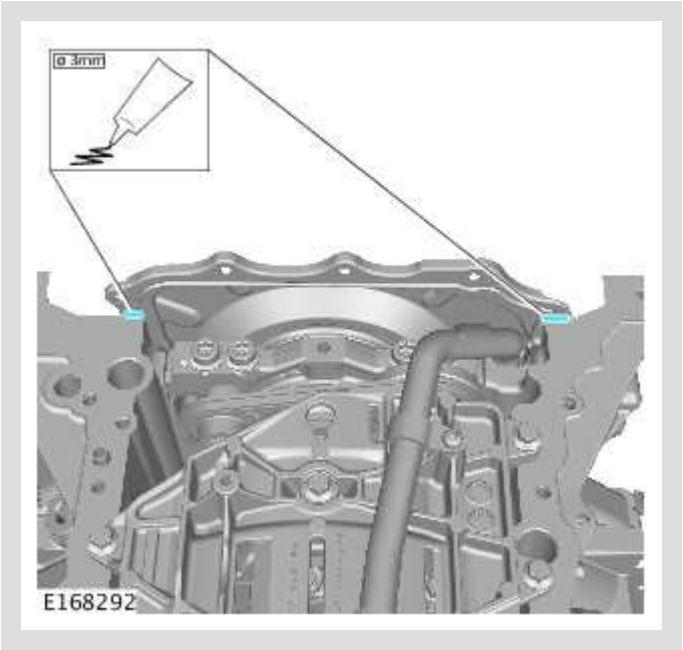
Torque: **12 Nm**

4.

CAUTION:

Use only a plastic scraper when removing the sealing material.

cardiagn.com



Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and install the oil pan extension within 7 minutes.

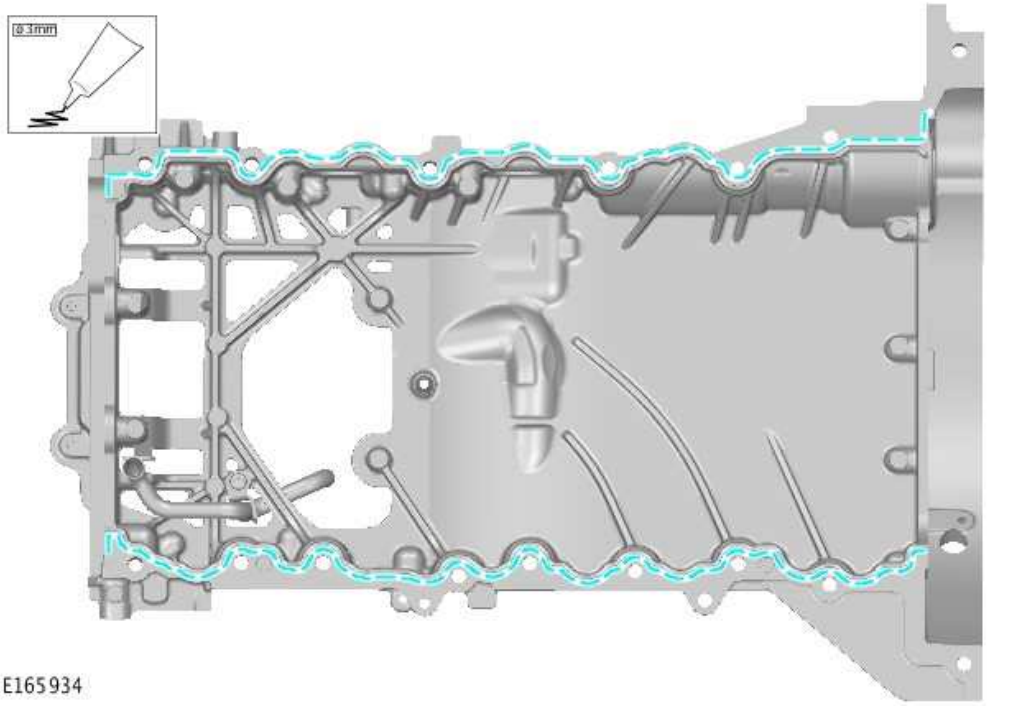
5.

CAUTIONS:

Make sure that the mating faces are clean and free of foreign material.

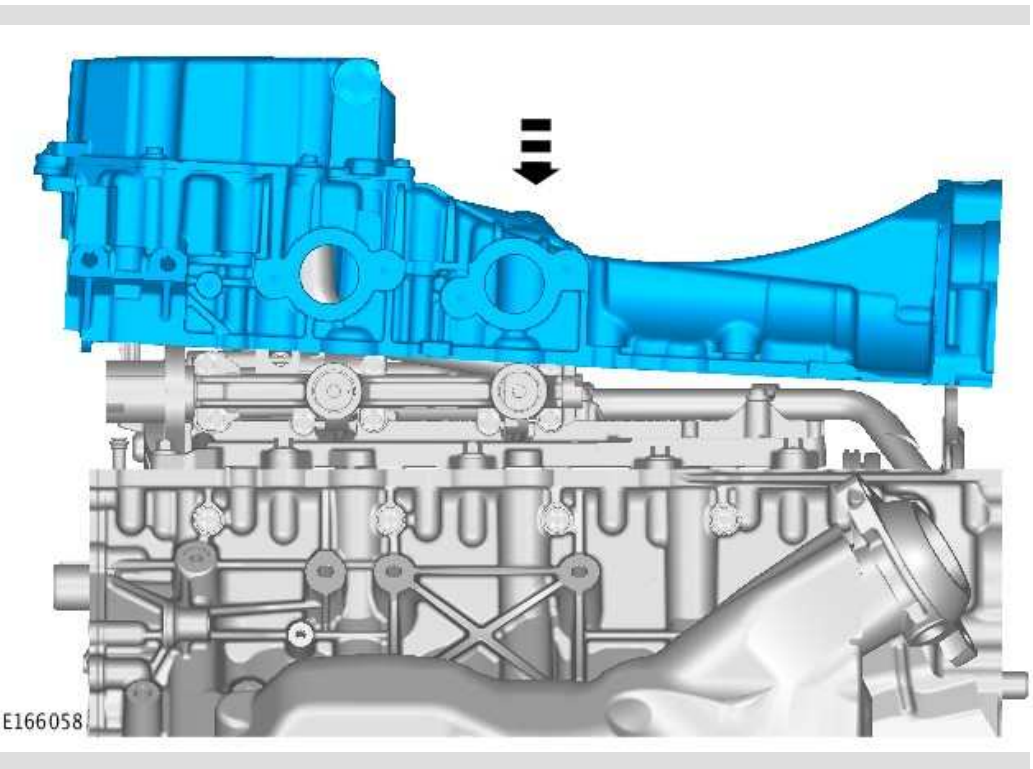
Use only a plastic scraper when removing the sealing material.

cardiagn.com



Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and tighten the bolts within 7 minutes.

6.

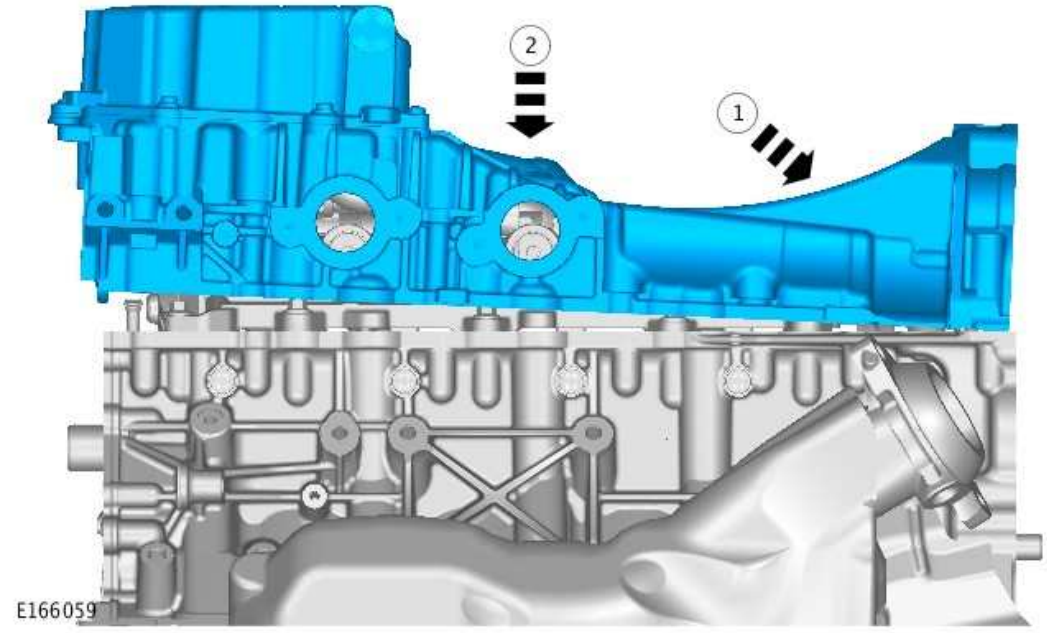


cardiagn.com

7.

CAUTION:

Install the component in the sequence shown.



8.

CAUTIONS:

- Install the bolts in the positions noted on removal.
- Only tighten the bolts finger tight at this stage.

cardiagn.com

9.

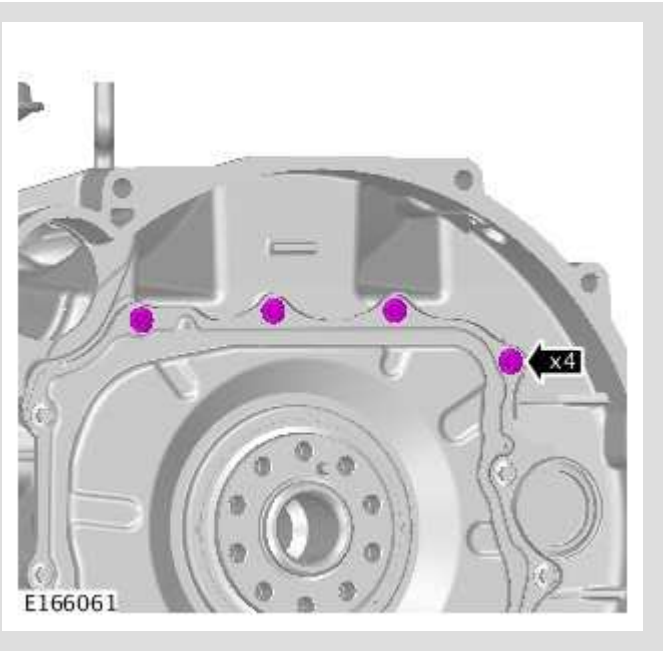
NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com

Torque: **25 Nm**

10.



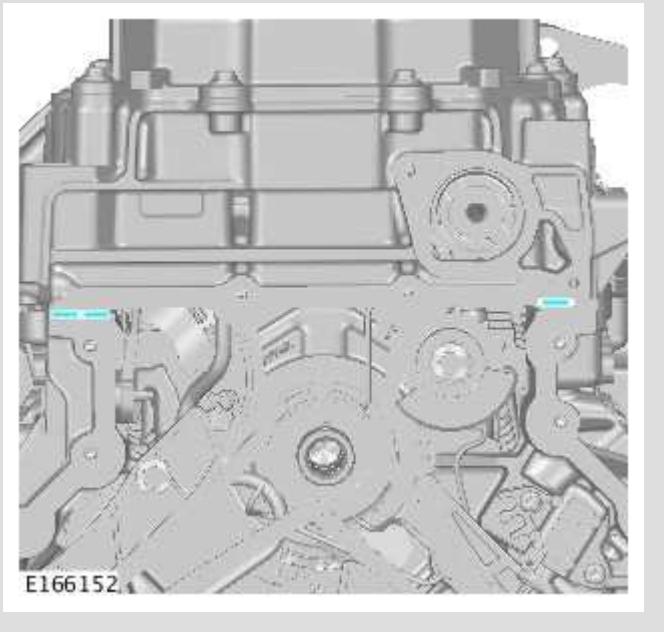
Torque: **12 Nm**

cardiagn.com

11.

CAUTIONS:

- Make sure that the mating faces are clean and free of foreign material.
- Use only a plastic scraper when removing the sealing material.



Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and install the lower timing cover within 7 minutes.

12.

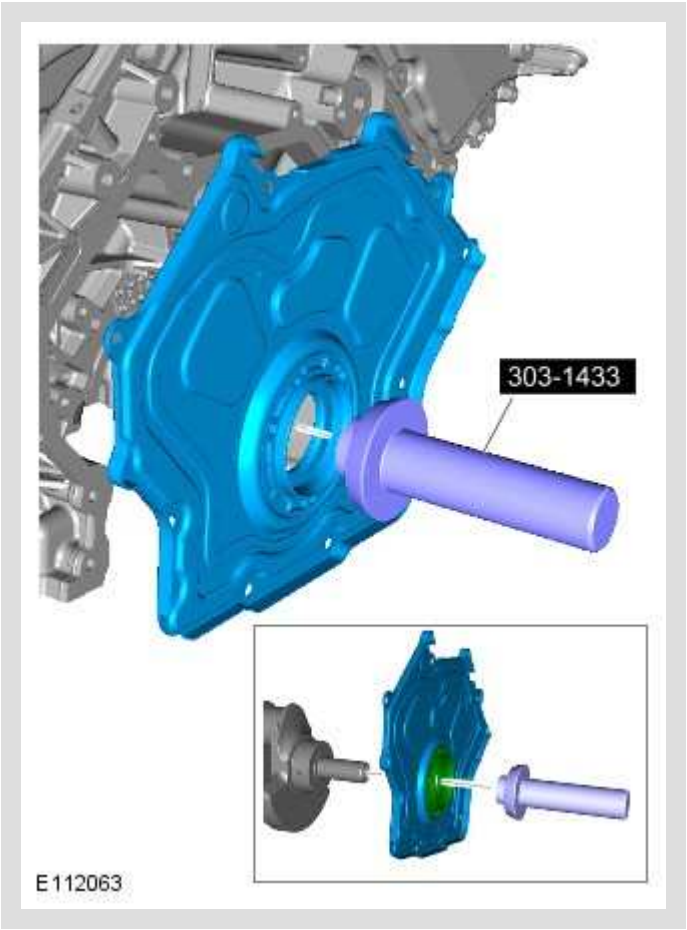
CAUTION:

Make sure that the mating faces are clean and free of foreign material.

NOTE:

Install a new lower timing cover.

cardiagn.com



Install the bolts, but do not tighten fully at this stage.

Special Tool(s): 303-1433

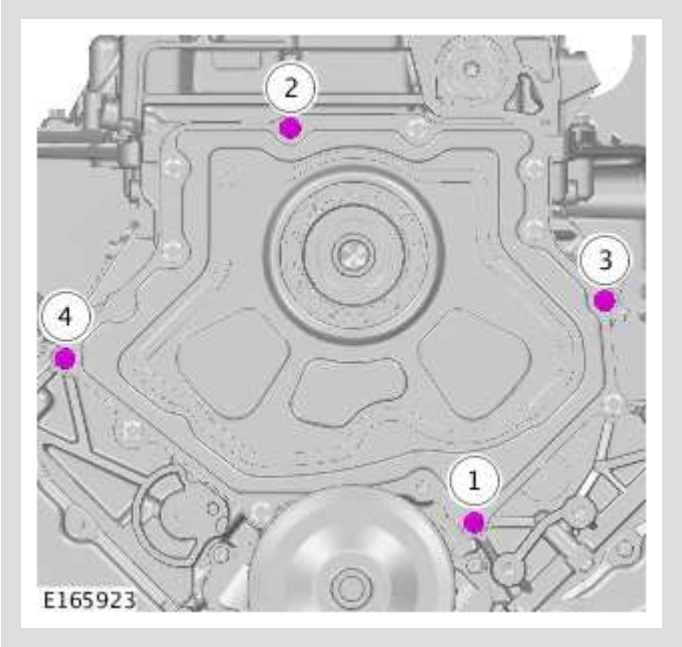
13.

NOTES:

Tighten the bolts in the indicated sequence.

Special tools shown removed for clarity.

cardiagn.com



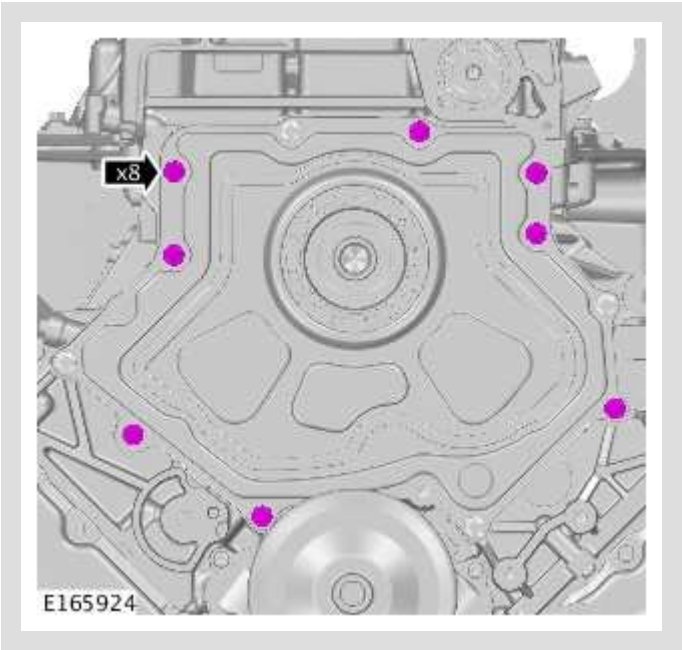
Torque: **12 Nm**

14.

NOTE:

Special tools shown removed for clarity.

cardiagn.com

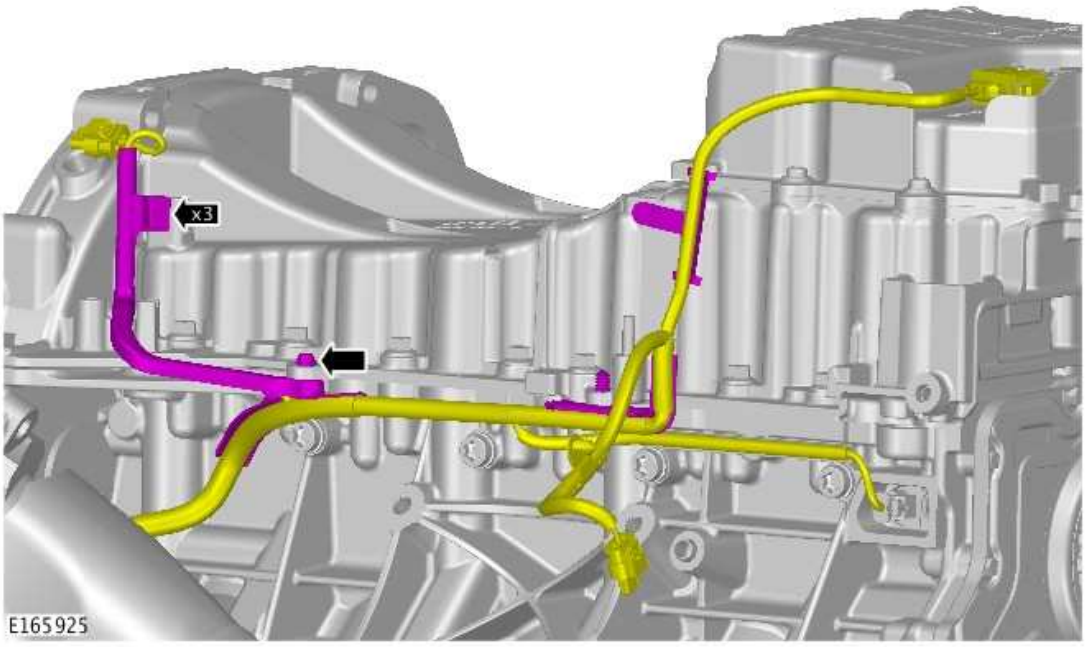


Torque: **12 Nm**

15. Remove the special tools.

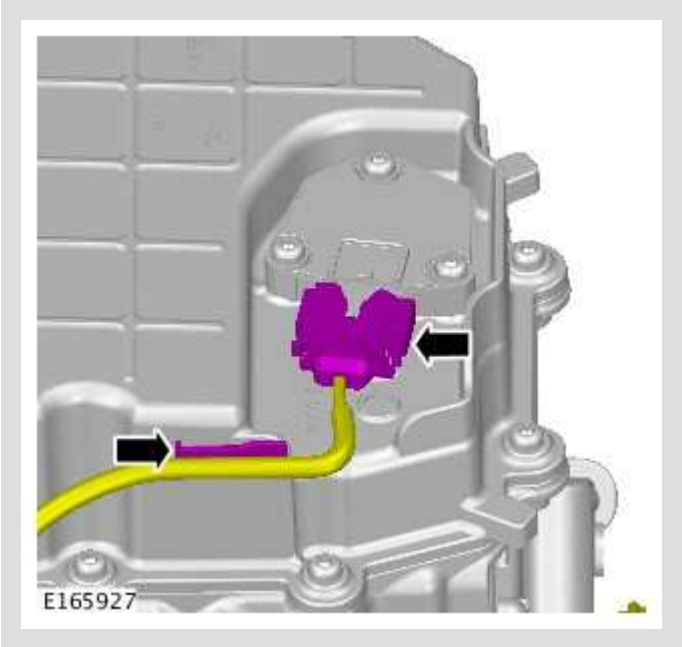
16.

cardiagn.com

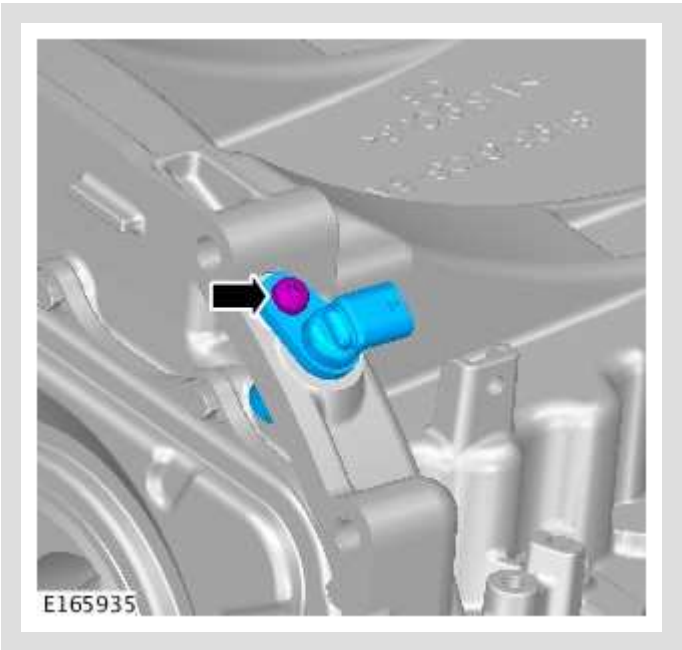


17.

cardiagn.com



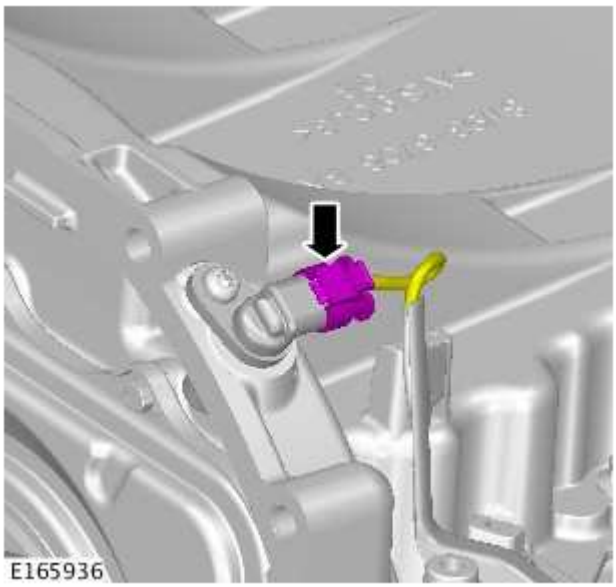
18.



Torque: **10 Nm**

cardiagn.com

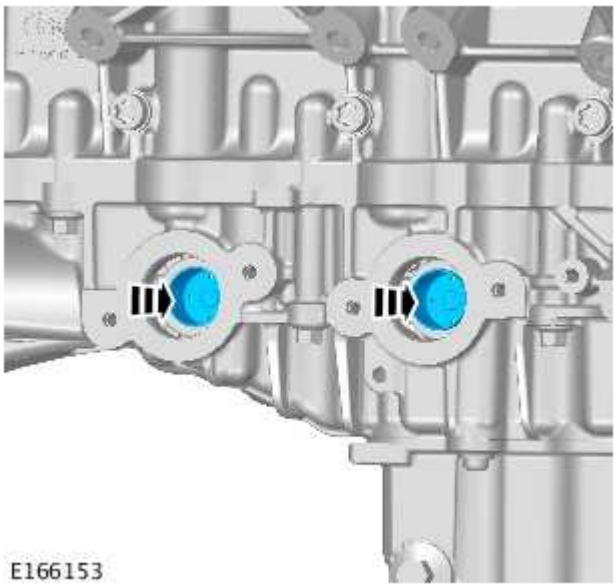
19.



20.

NOTE:

Lubricate the high-pressure fuel pump buckets with clean engine oil.



21.

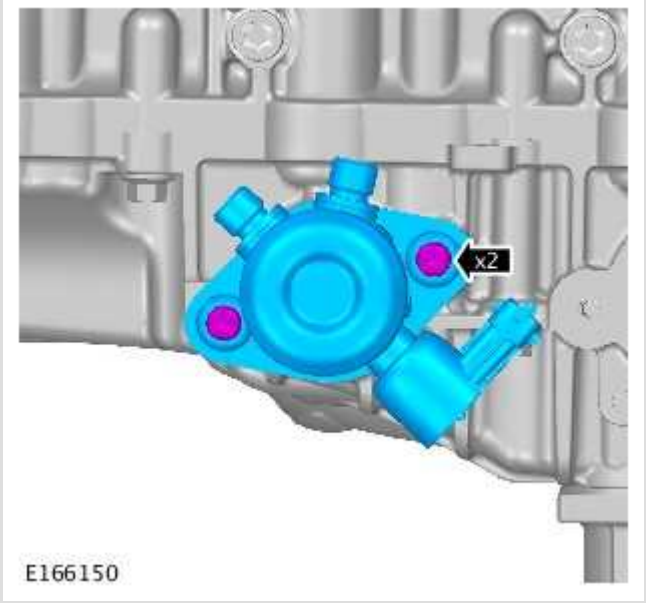
CAUTION:

cardiagn.com

Tighten the Torx screws a turn at a time until the correct torque is achieved.

NOTE:

Lubricate the high-pressure fuel pump O-ring seal with clean engine oil.



Torque: **11 Nm**

22.

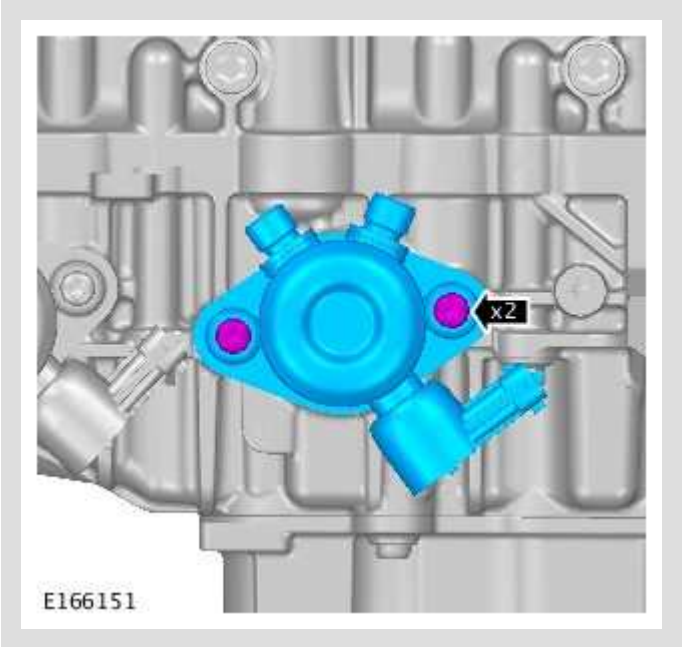
CAUTION:

Tighten the Torx screws a turn at a time until the correct torque is achieved.

NOTE:

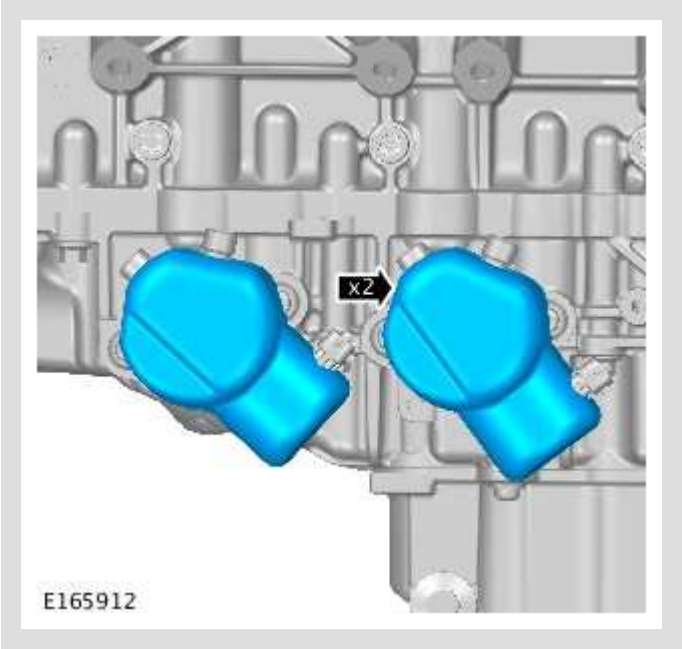
Lubricate the high-pressure fuel pump O-ring seal with clean engine oil.

cardiagn.com



Torque: **11 Nm**

23.



24.

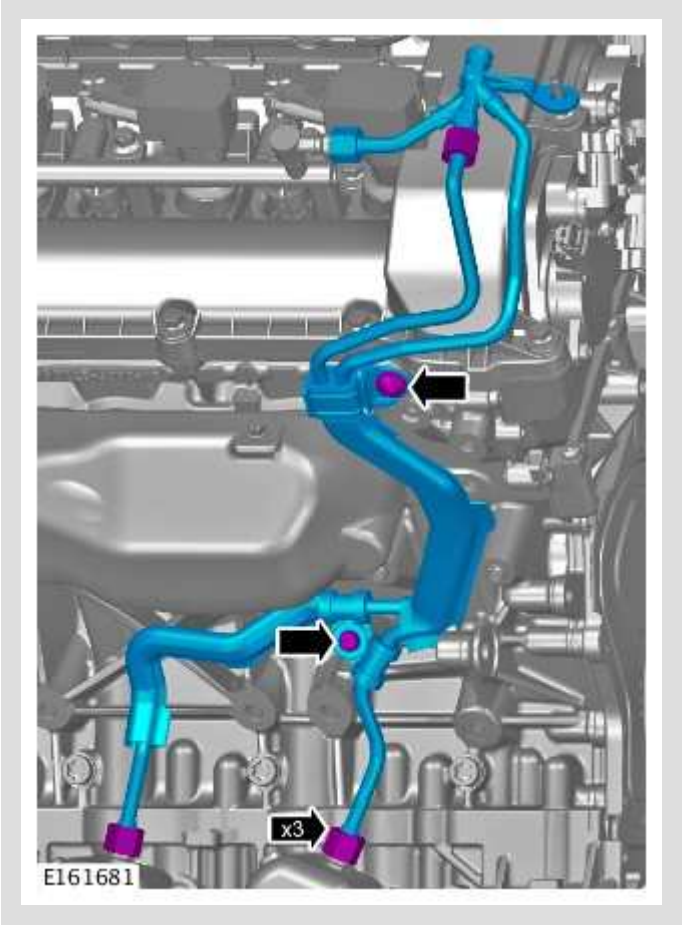
CAUTIONS:

- Install new high-pressure fuel supply lines.
- Lubricate only the union threads with clean engine oil.
- Only tighten the bolts and unions finger tight at this stage.

cardiagn.com

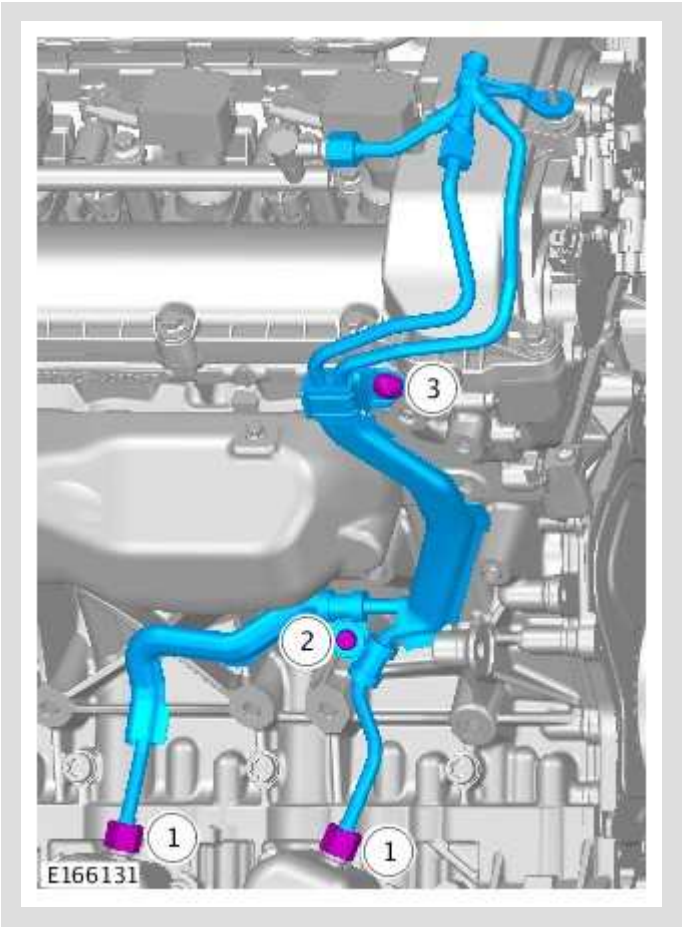
NOTE:

Remove and discard the blanking caps.



25.

cardiagn.com



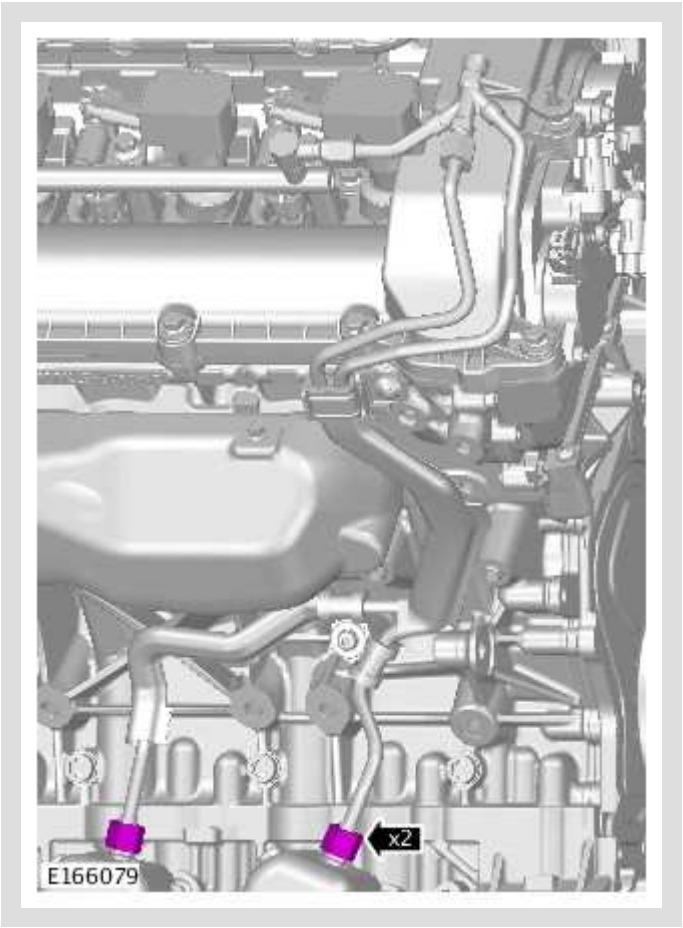
Torque:

Unions (1) **21 Nm**

M6 (2) **11 Nm**

M8 (3) **25 Nm**

cardiagn.com



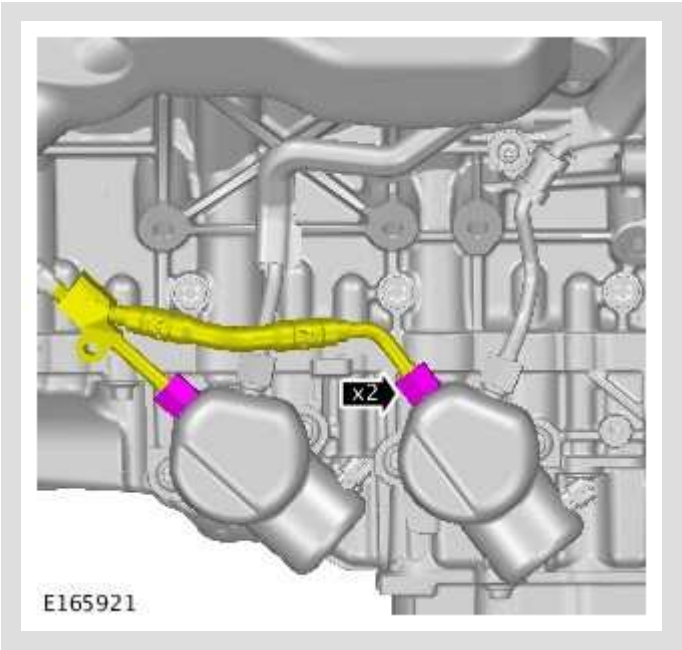
Torque: **21 Nm**

27.

NOTES:

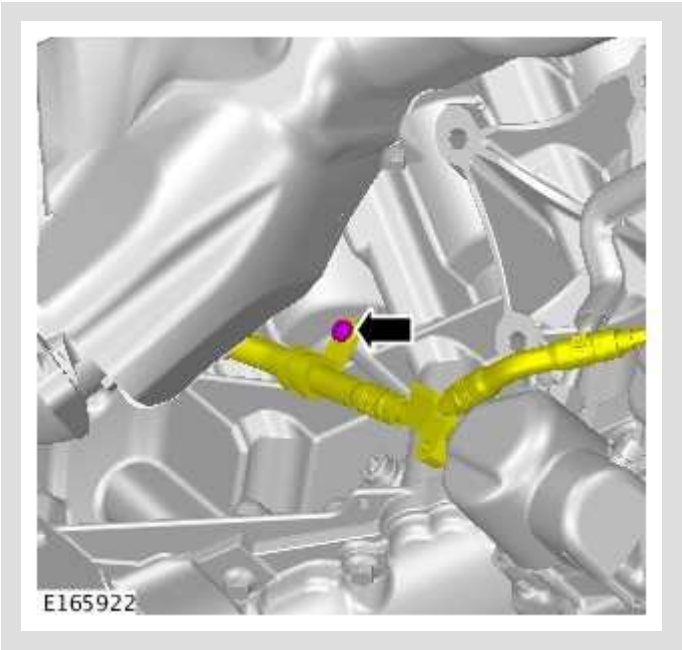
- Install the bolt and unions finger tight before final tightening.
- Remove and discard the blanking caps.

cardiagn.com



Torque: **21 Nm**

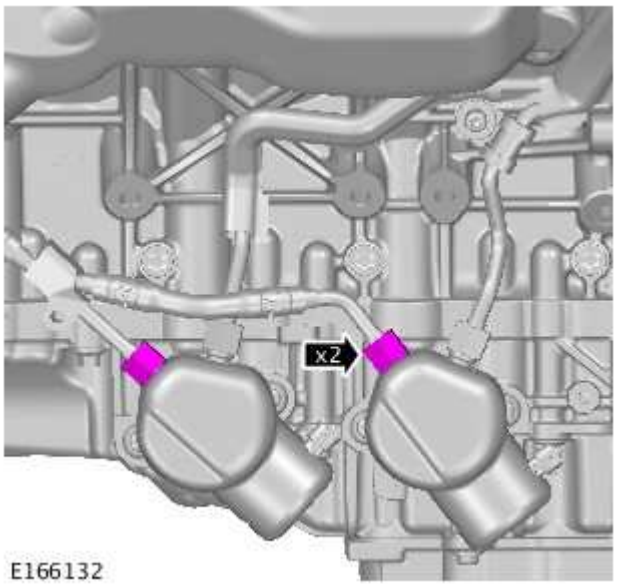
28.



Torque: **11 Nm**

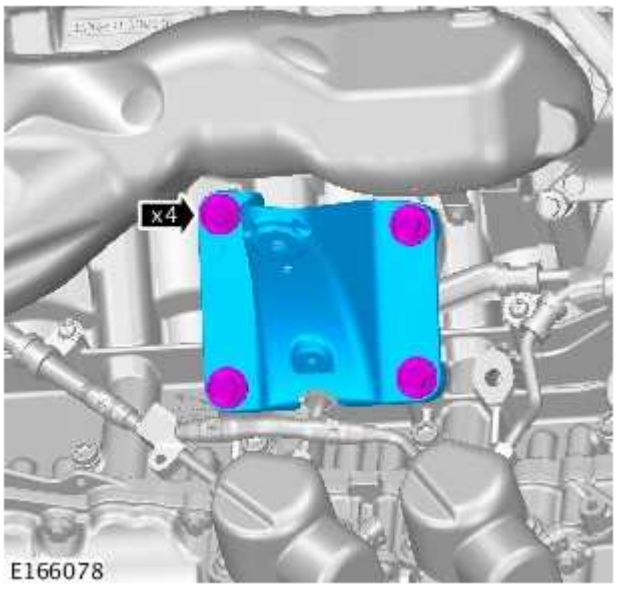
cardiagn.com

29.



Torque: **21 Nm**

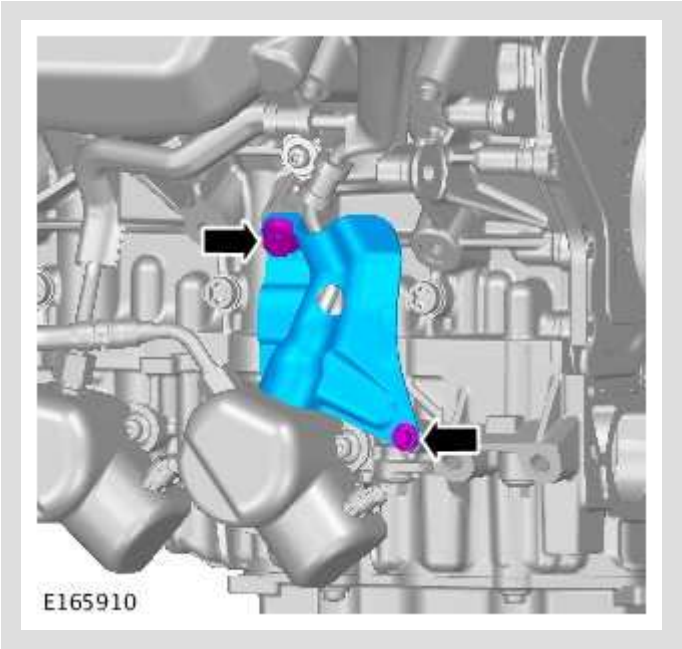
30.



Torque: **48 Nm**

31.

cardiagn.com



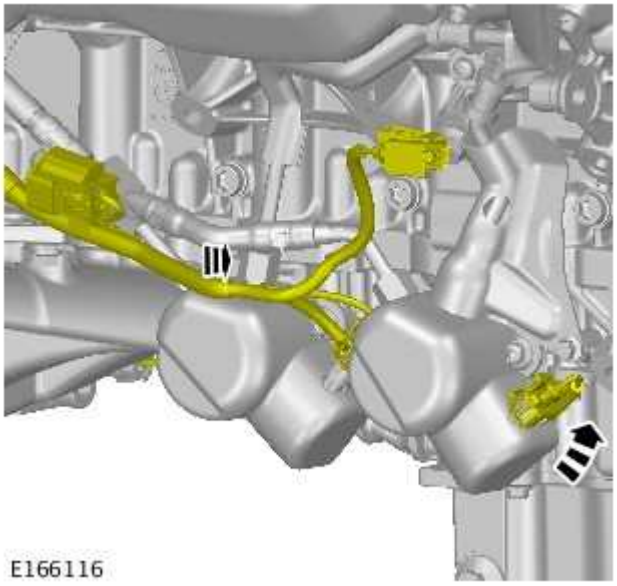
Torque:

M10 **29 Nm**

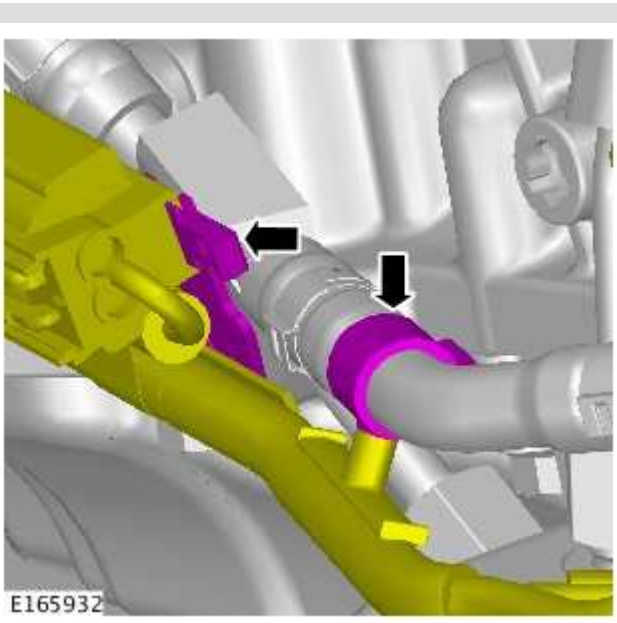
M6 **11 Nm**

32.

cardiagn.com

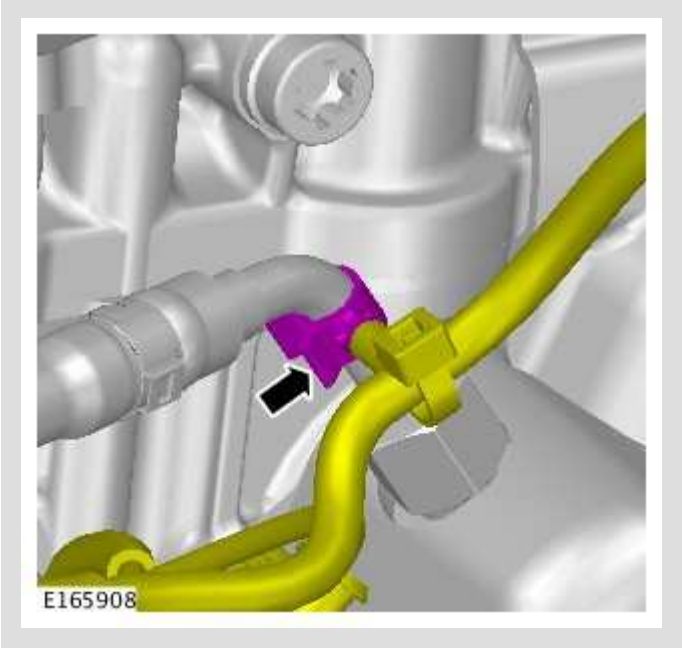


33.



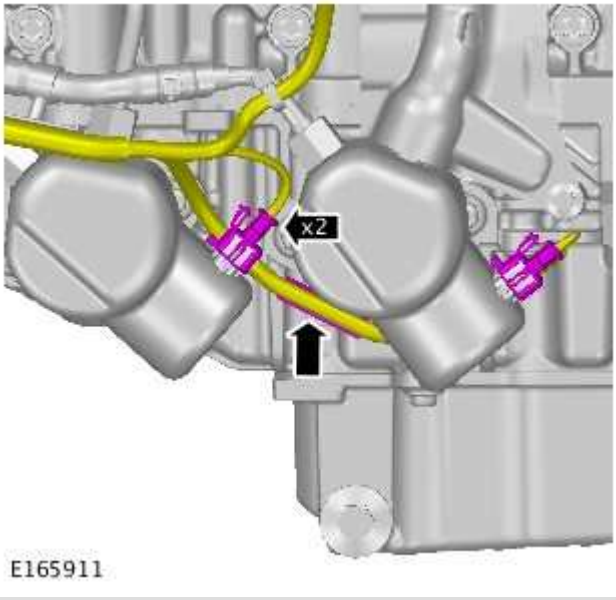
34.

cardiagn.com



35.

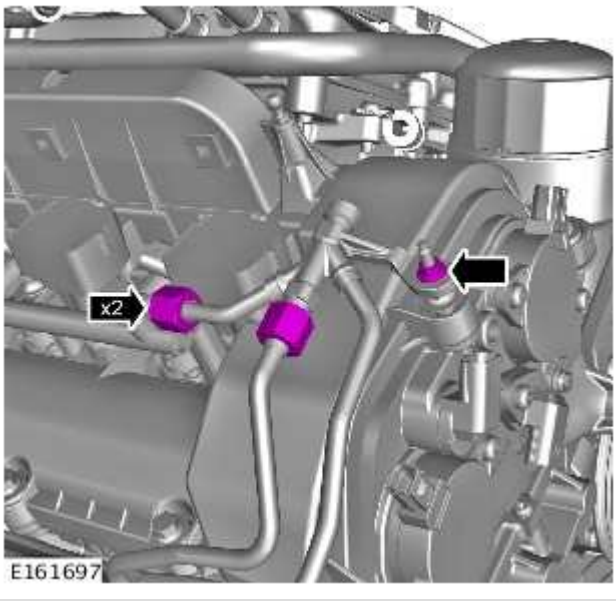
cardiagn.com



36.

NOTES:

- Install the nut and unions finger tight before final tightening.
- Remove and discard the blanking caps.



Torque:

Unions **21 Nm**

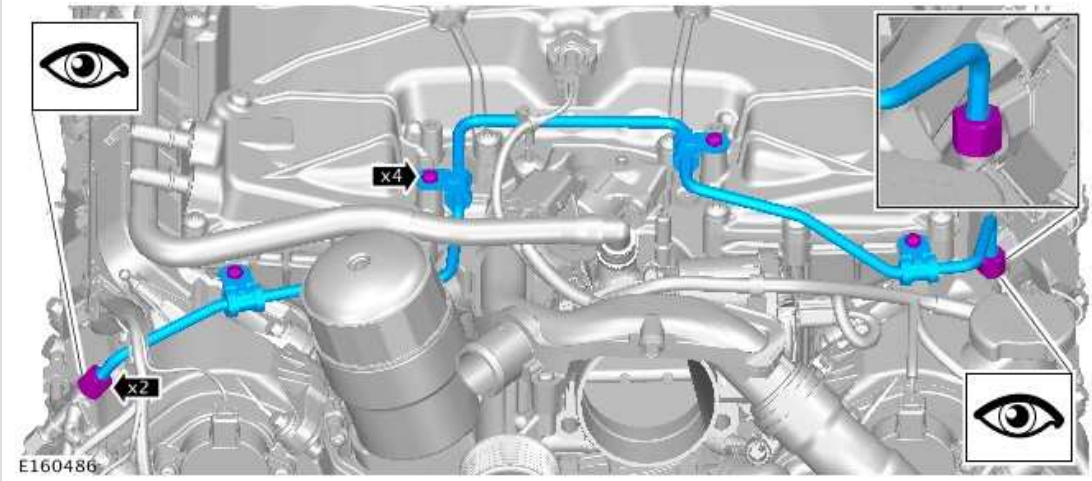
M5 nut **6 Nm**

cardiagn.com

37.

CAUTIONS:

- This fuel pipe can be re-used, inspect for signs of damage. Renew if necessary.
- Make sure that all openings are sealed. Use new blanking caps.



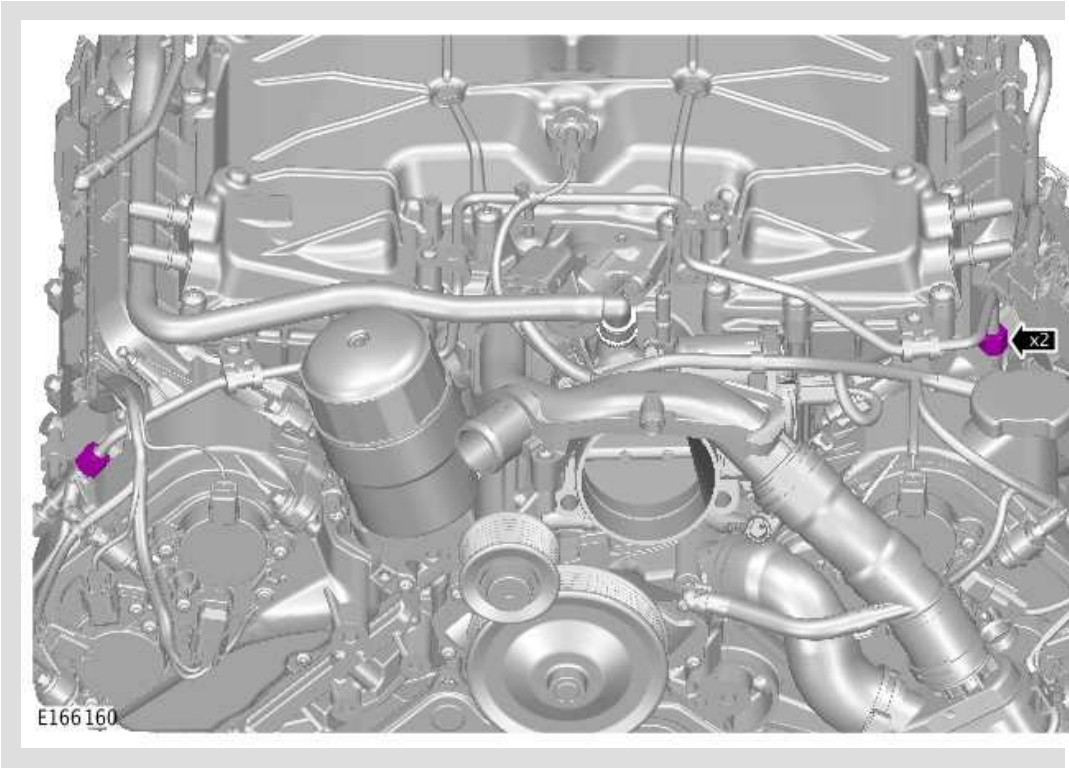
Torque:

Unions **21 Nm**

M6 **8 Nm**

38.

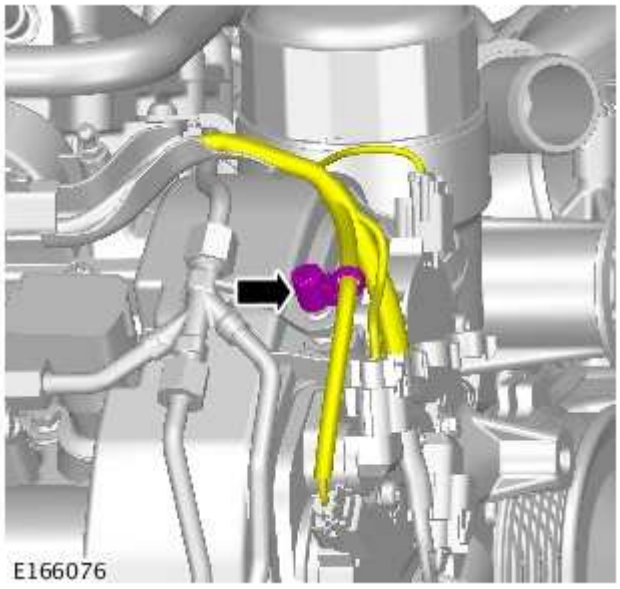
cardiagn.com



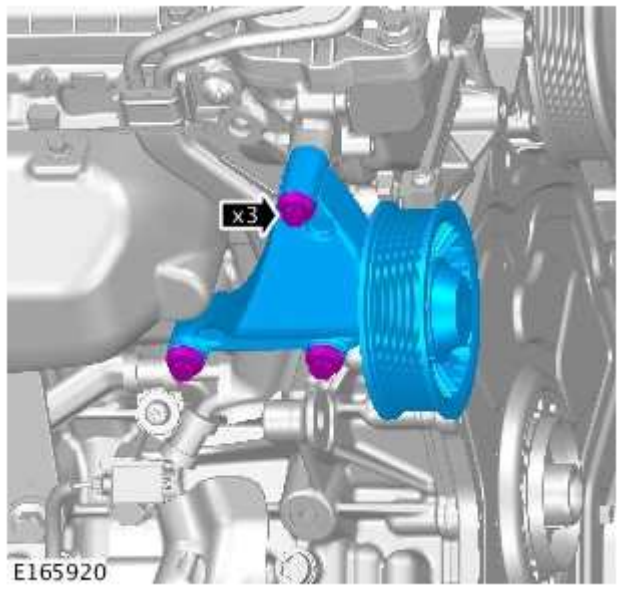
Torque: **21 Nm**

39.

cardiagn.com



40.



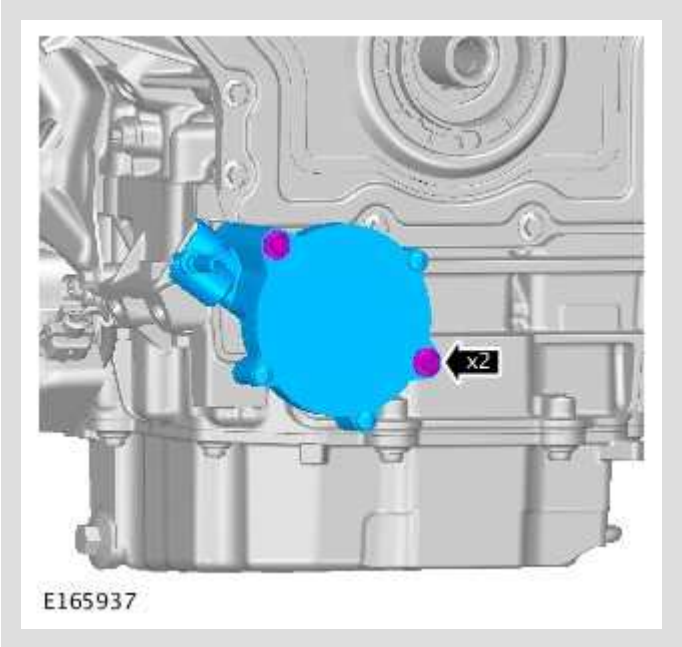
Torque: **25 Nm**

41.

△ **NOTE:**

cardiagn.com

Lubricate the seal with clean engine oil.



Torque: **12 Nm**

42.

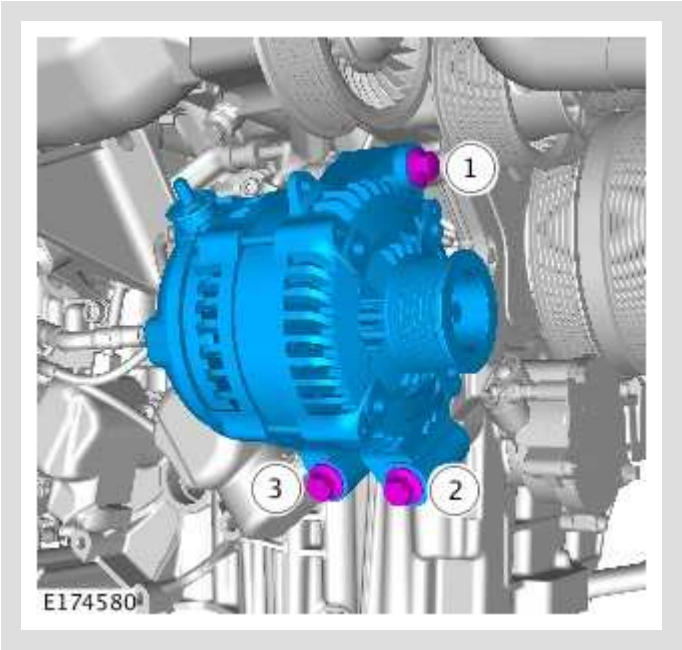
CAUTION:

Install all the bolts finger tight before final tightening.

NOTE:

Tighten the bolts in the indicated sequence.

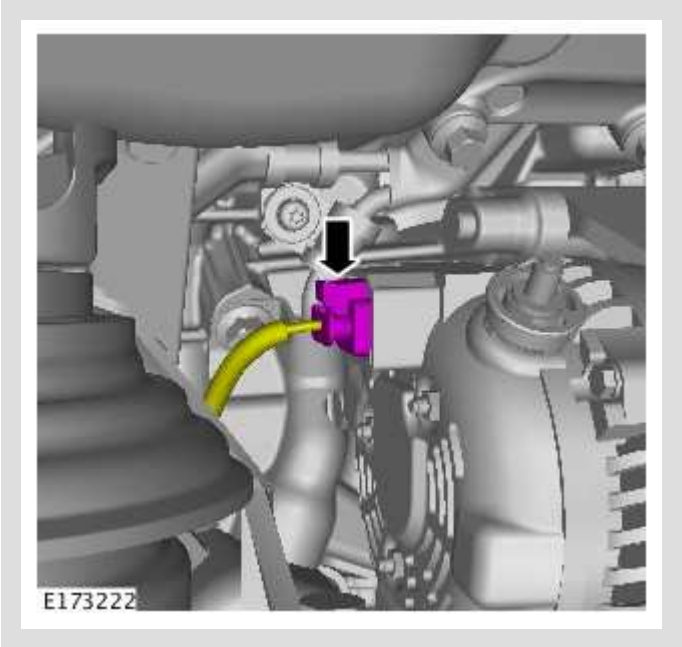
cardiagn.com



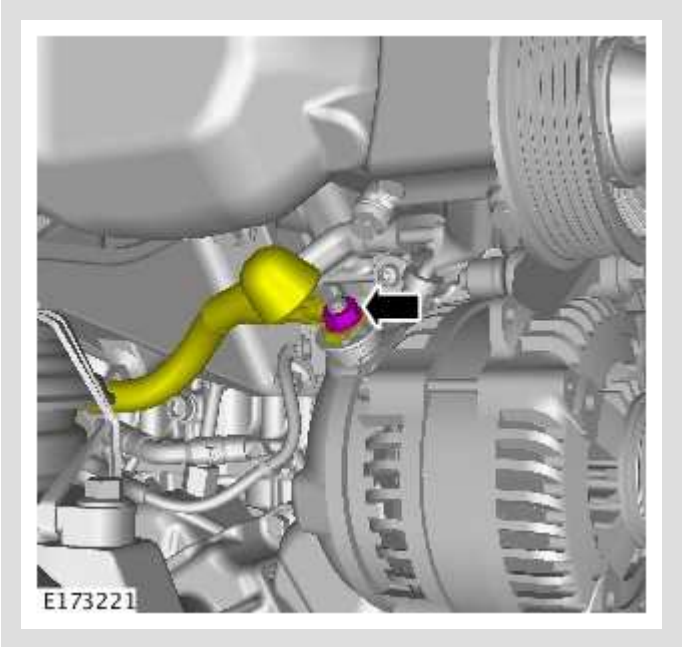
Torque: **48 Nm**

43.

cardiagn.com



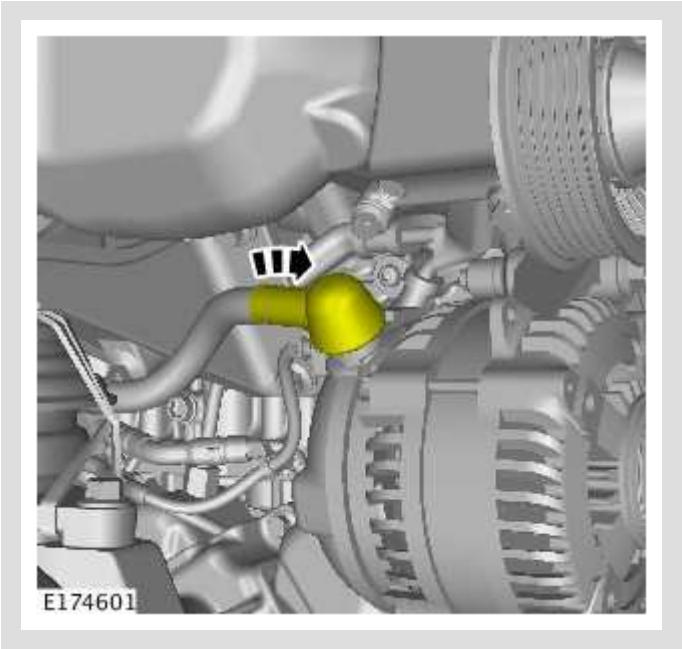
44.



Torque: **12 Nm**

45.

cardiagn.com



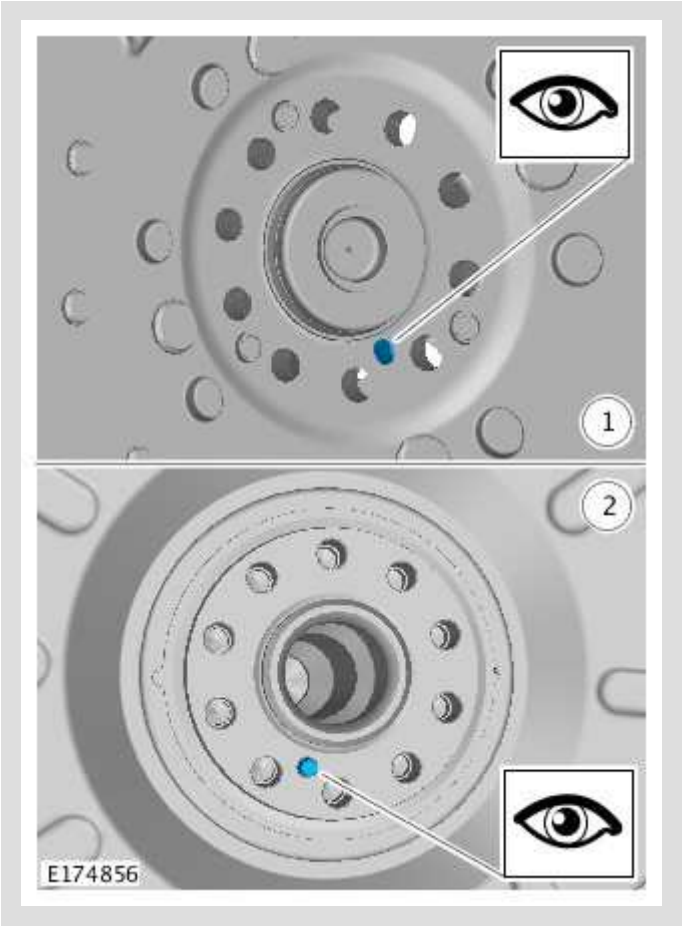
Vehicles with manual transmission

46.

NOTE:

Make sure the crankshaft and flywheel mating faces are clean before installation.

cardiagn.com



Make sure that the flywheel (1) is aligned with the crankshaft dowel (2).

47.

CAUTION:

Make sure that the component is correctly located on the dowel.

cardiagn.com

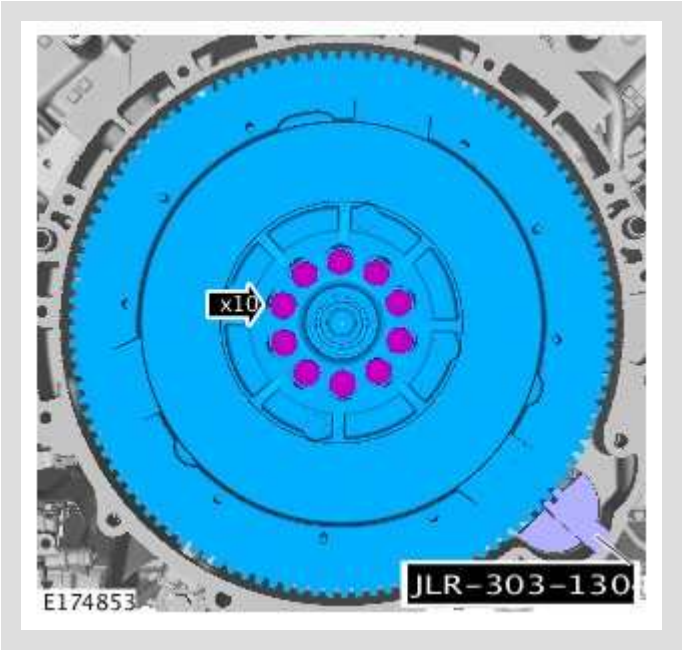
Special Tool(s): JLR-303-1304

48.

CAUTIONS:

- Make sure that new bolts are installed.
- Only tighten the bolts finger tight at this stage.

cardiagn.com



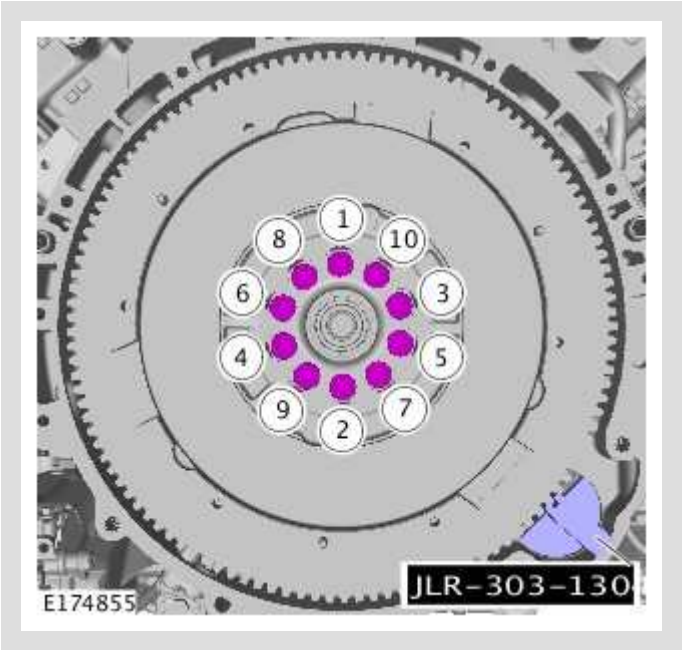
Special Tool(s): JLR-303-1304

49.

CAUTION:

Tighten the bolts in the sequence shown.

cardiagn.com



Special Tool(s): JLR-303-1304

Torque:

Stage 1: **30 Nm**

Stage 2: **120°**

Vehicles with automatic transmission

50.

CAUTIONS:

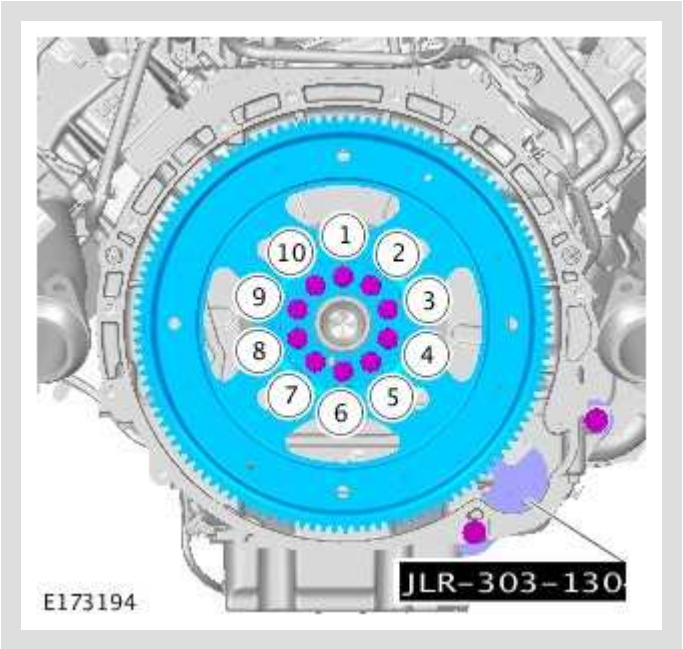
- Install all the bolts finger tight before final tightening.
- The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
- Tighten the bolts in the sequence shown.

NOTES:

- Make sure that the crankshaft is not rotated.

cardiagn.com

- Make sure the crankshaft and flexplate mating faces are clean before installation.



Install the special tool.

Special Tool(s): JLR-303-1304

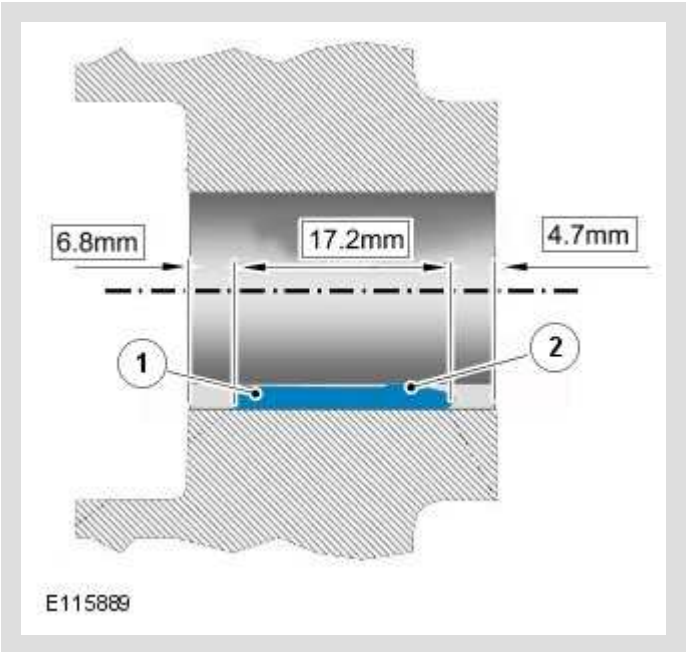
Torque:

Stage 1: **45 Nm**

Stage 2: **90°**

All vehicles

51.



1. Apply RTV sealant to the crankshaft pulley keyway.

cardiagn.com

1. Make sure that the RTV sealant is applied in a 2mm diameter bead.
1. Make sure that when the RTV sealant is applied that the RTV sealant is level with the top of the keyway.

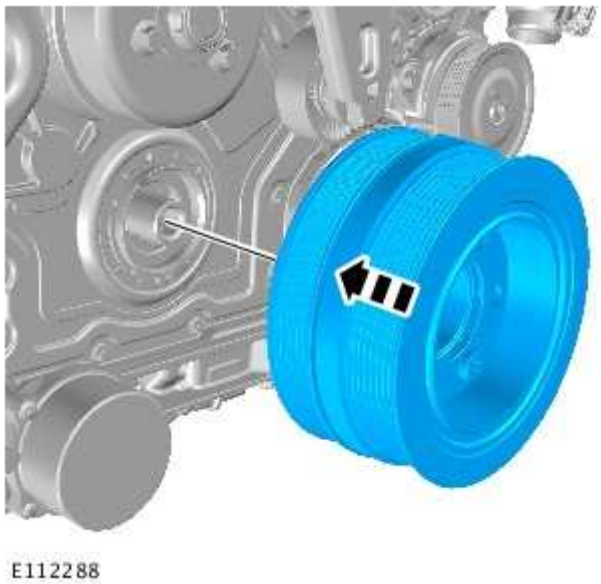
52.

CAUTION:

Install a new friction washer before installing the crankshaft pulley.

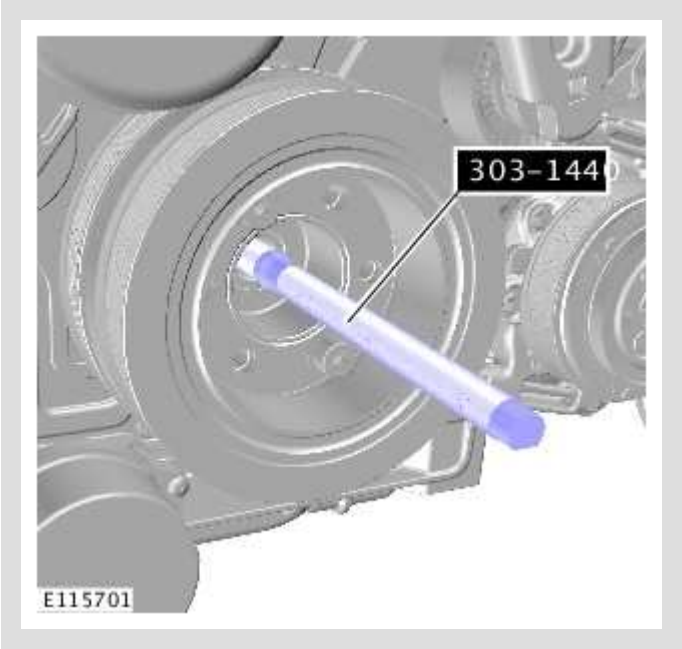
NOTE:

Make sure to clean the threads in the end of the crankshaft and that the crank nose is free of any foreign materials.



53.

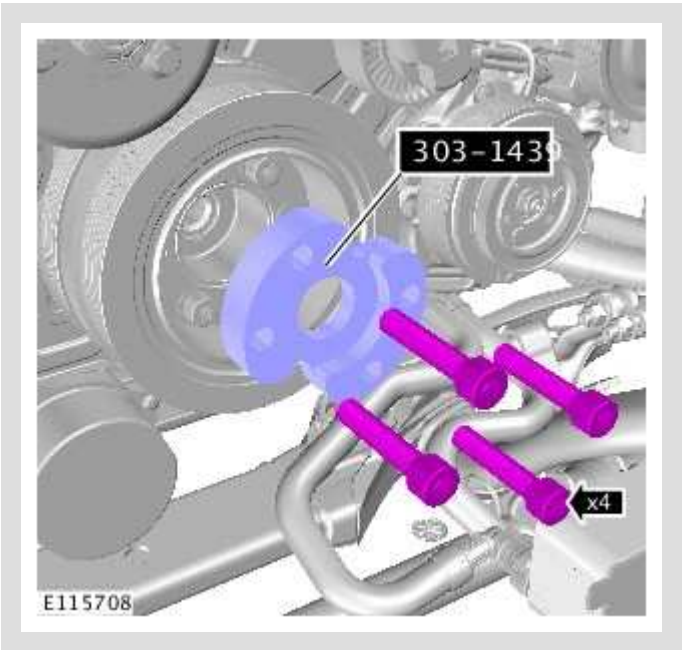
cardiagn.com



Install the special tool.

Special Tool(s): 303-1440

54.



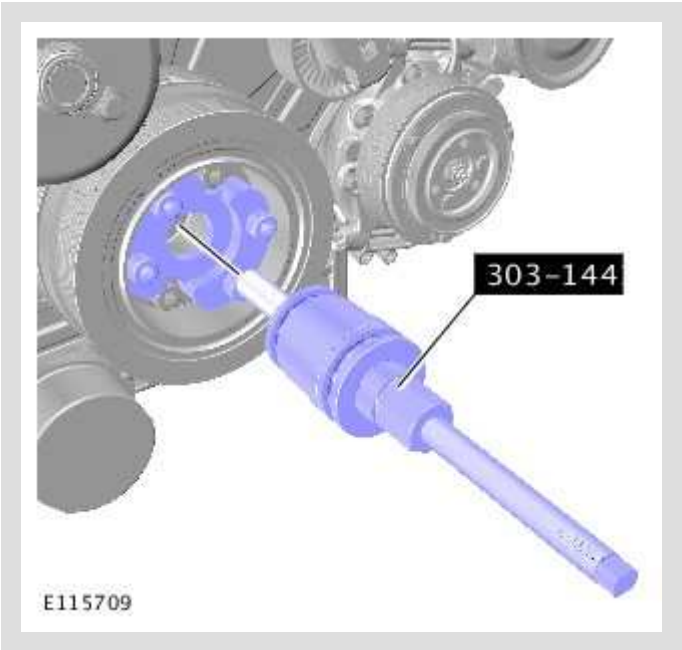
Install the special tool.

Special Tool(s): 303-1439

Torque: **25 Nm**

cardiagn.com

55.



Install the special tool.

Special Tool(s): 303-1441

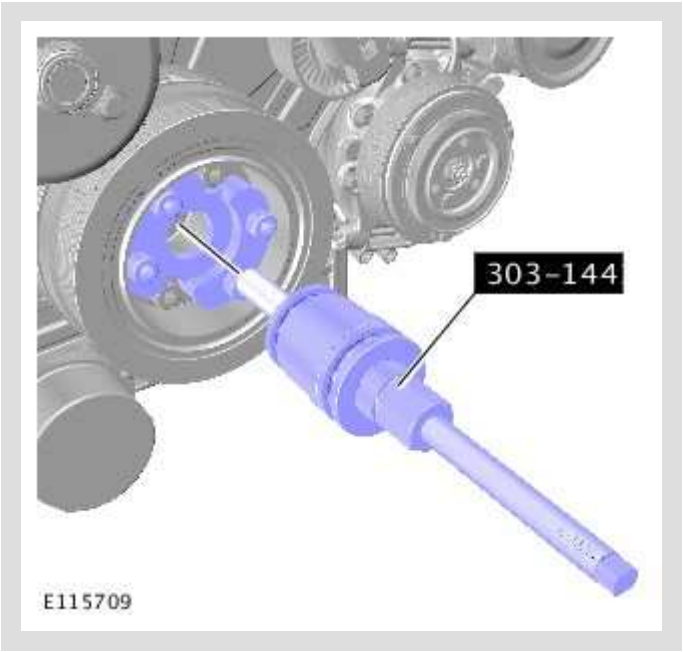
56.

CAUTION:

Rotate the crankshaft pulley installation tool until the pulley is fully located, do not over tighten. Failure to do this may result in damage to the components.

cardiagn.com

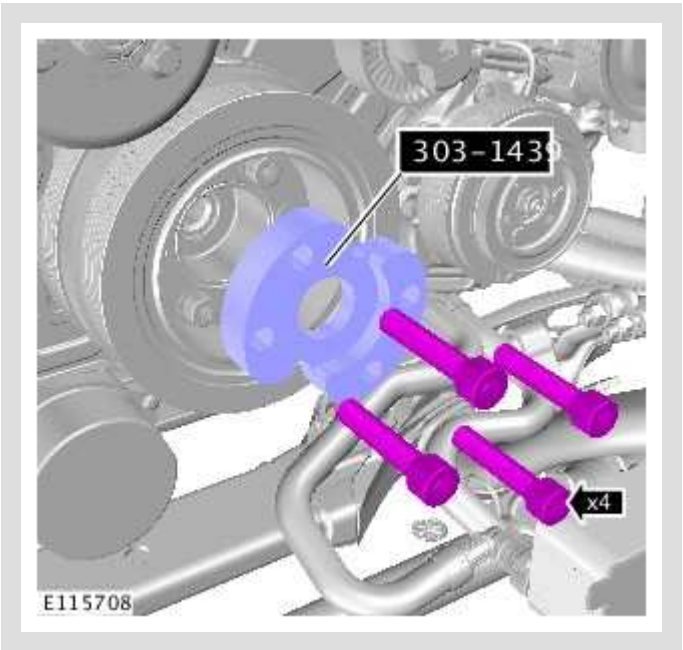
57.



Remove the special tool.

Special Tool(s): 303-1441

58.

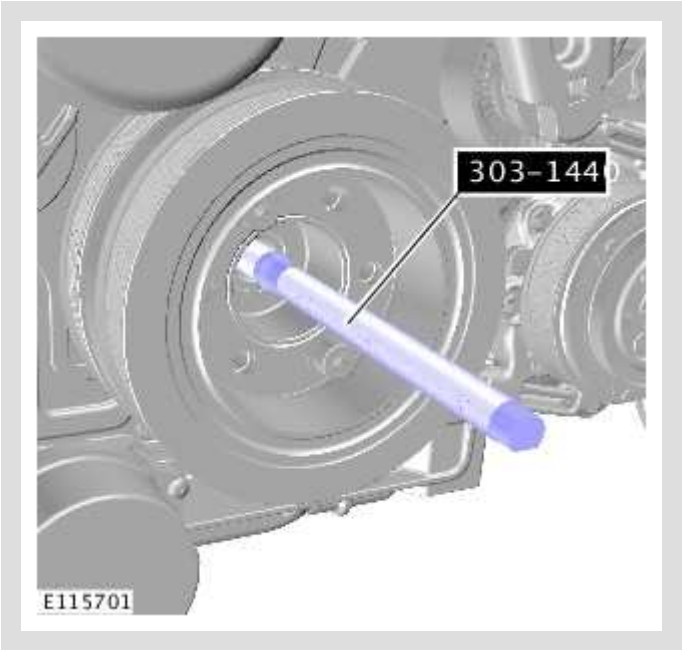


Remove the special tool.

Special Tool(s): 303-1439

59.

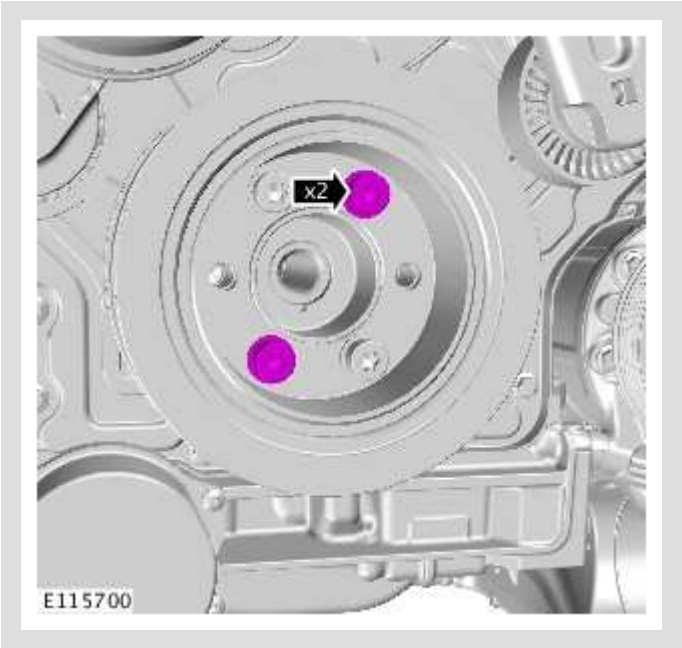
cardiagn.com



Remove the special tool.

Special Tool(s): 303-1440

60.



Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

cardiagn.com

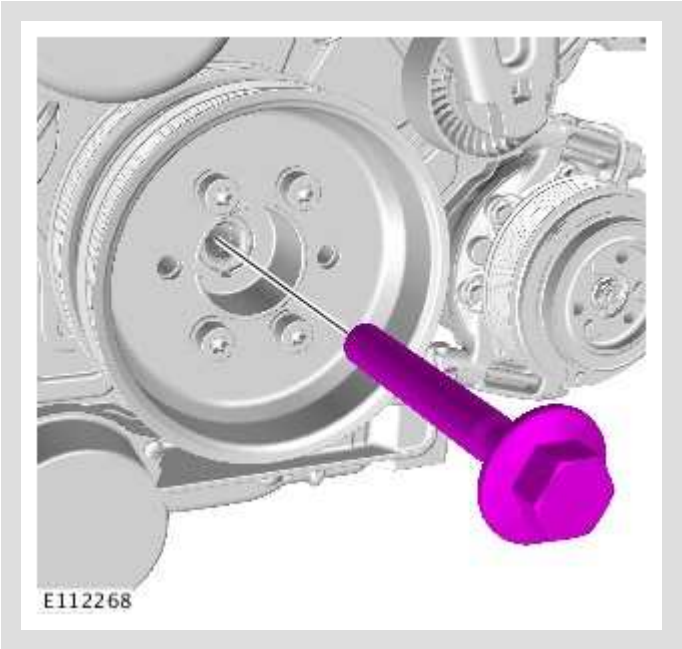
61.

WARNING:

Make sure that a new bolt is installed.

CAUTION:

Tighten the component finger tight first.



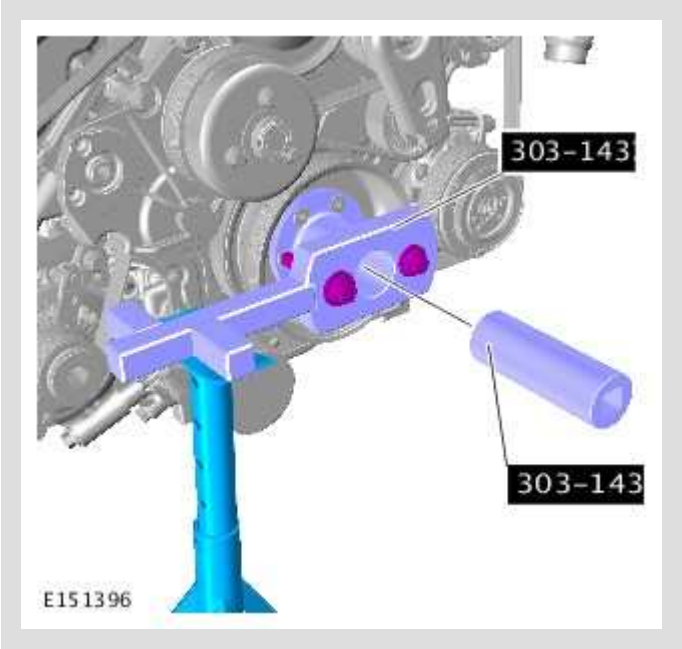
Install the crankshaft pulley bolt.

62.

NOTE:

The graphic shows the step for LH thread only, RH thread will be the opposite.

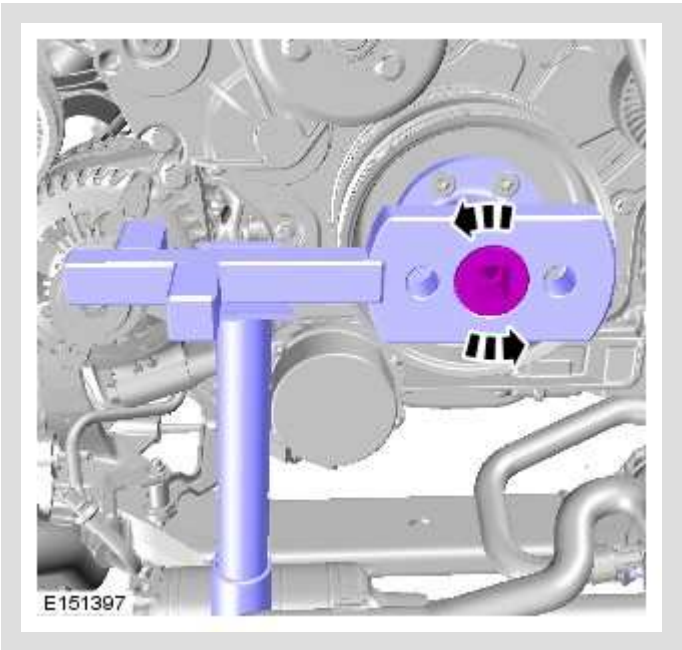
cardiagn.com



Special Tool(s): 303-1438 , 303-1437

Torque: **25 Nm**

63.



Special Tool(s): 303-1438 , 303-1437

cardiagn.com

Torque: **200 Nm**

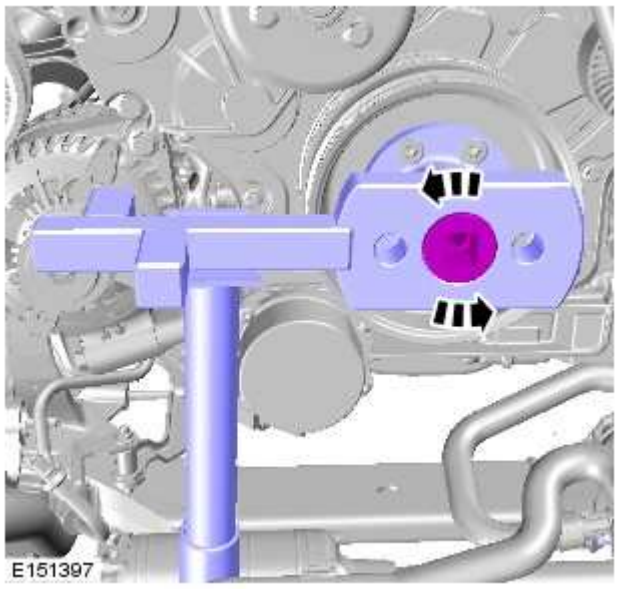
64.

CAUTION:

Make sure that the socket is turned through 270 degrees not the torque wrench.

NOTE:

The use of a torque multiplier capable of 600Nm will be required.

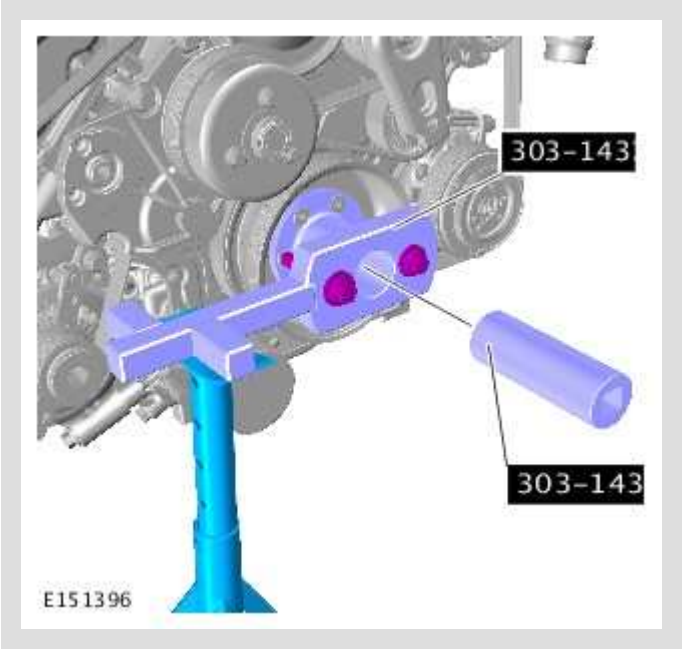


Special Tool(s): 303-1438 , 303-1437

Torque: **270°**

65.

cardiagn.com

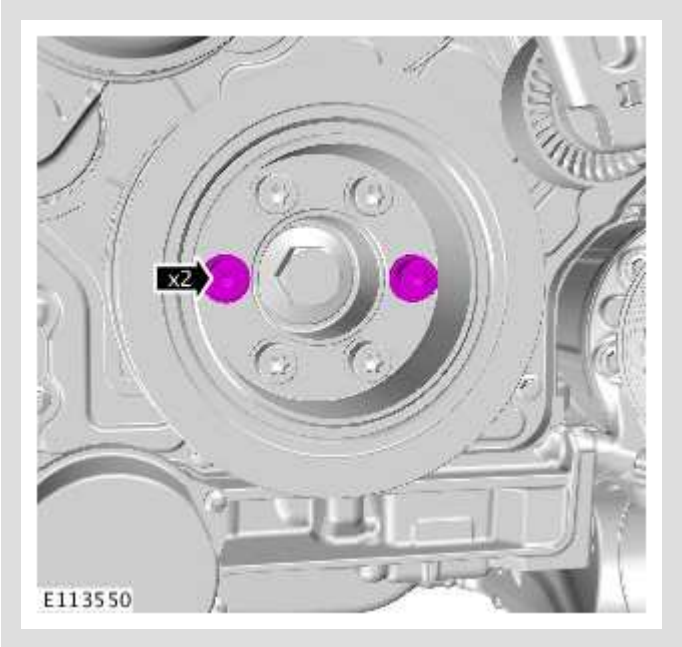


Remove the special tools.

Special Tool(s): 303-1438 , 303-1437

66.

cardiagn.com

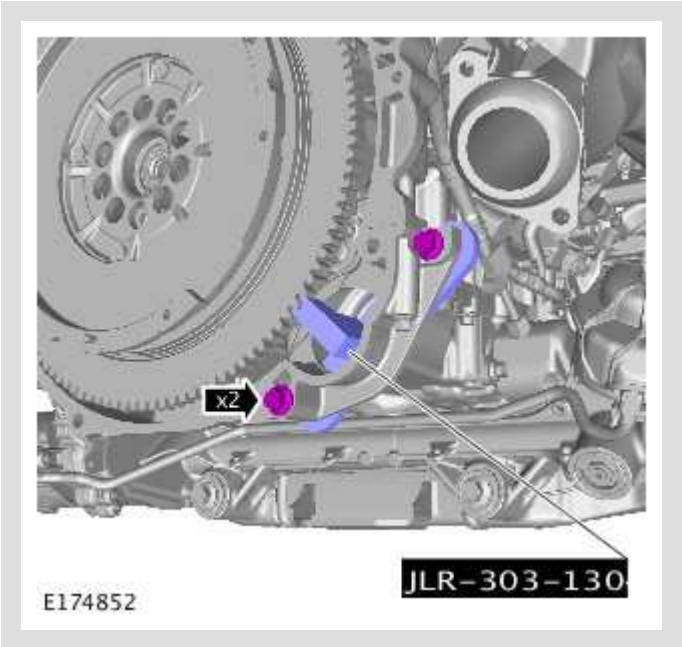


Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

Vehicles with manual transmission

67.



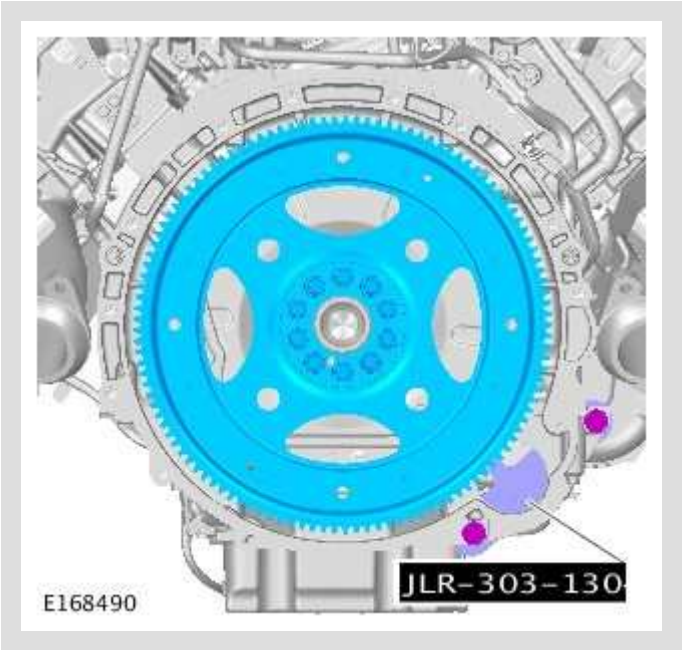
Remove the special tool.

Special Tool(s): JLR-303-1304

Vehicles with automatic transmission

68.

cardiagn.com

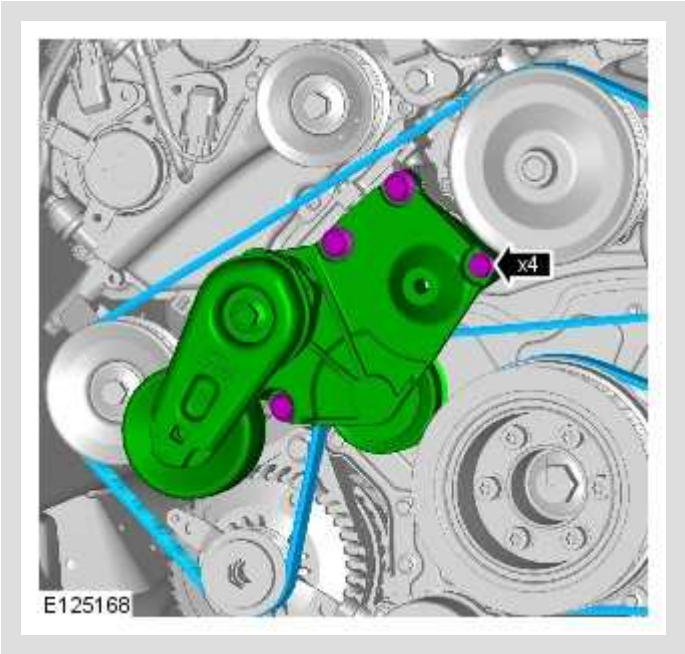


Remove the special tool.

Special Tool(s): JLR-303-1304

All vehicles

69.



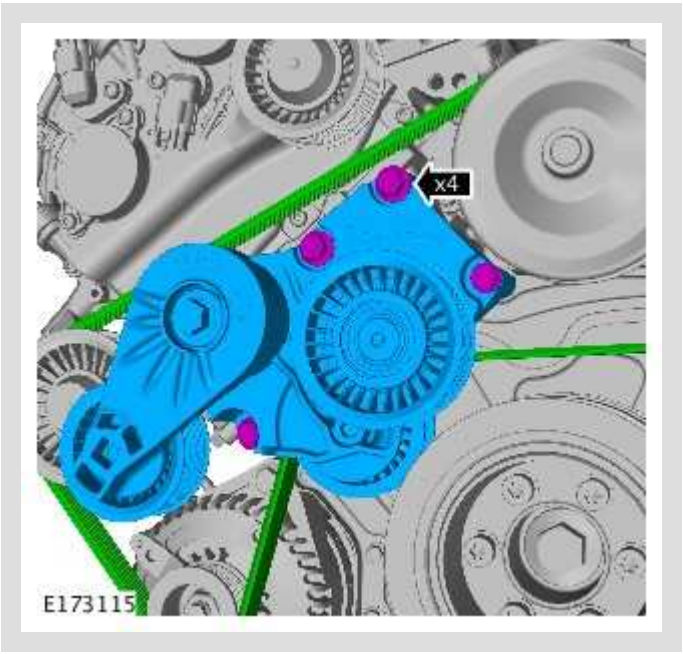
Torque: **25 Nm**

70.

NOTE:

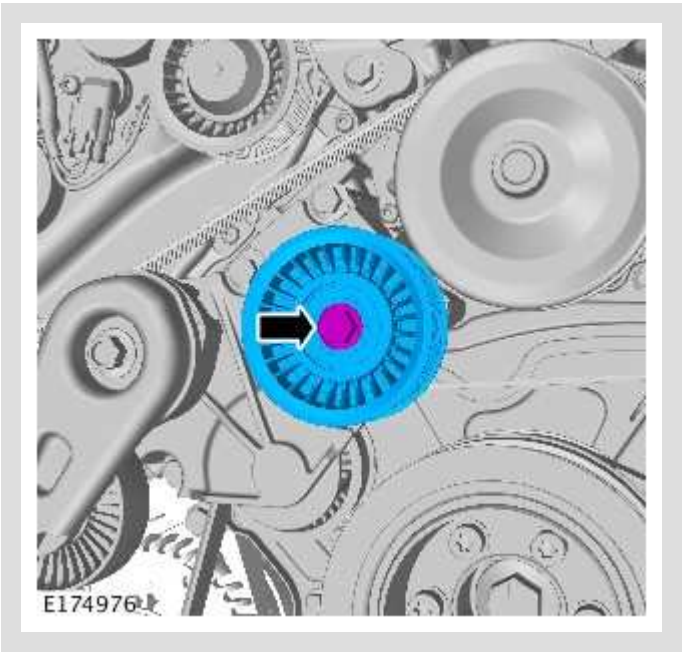
cardiagn.com

If equipped.



Torque: **25 Nm**

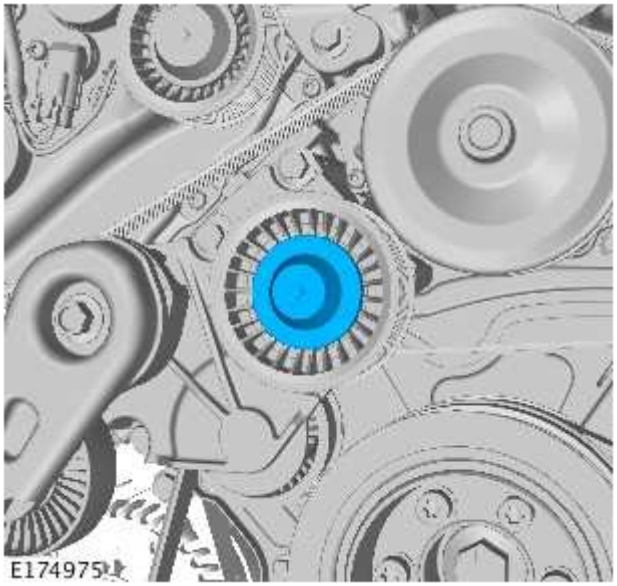
71.



Torque: **48 Nm**

72.

cardiagn.com



73.

NOTE:

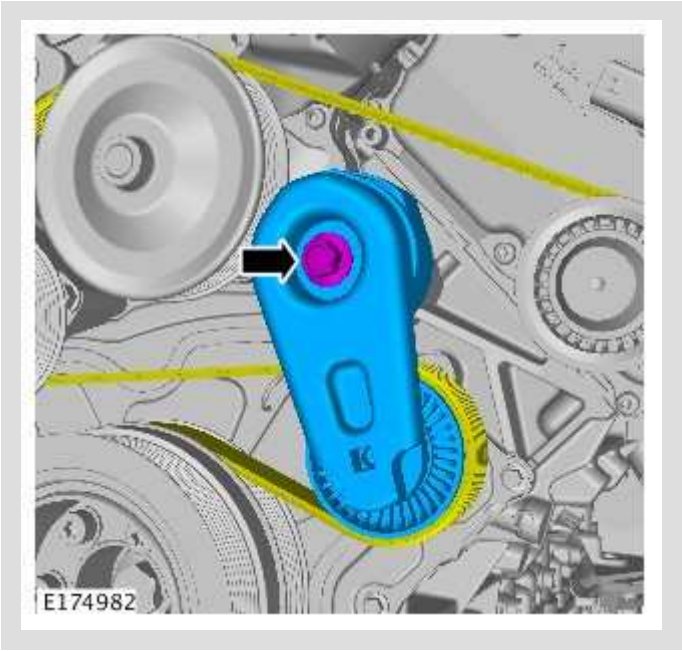
If equipped.

cardiagn.com

Torque: **48 Nm**

74.

cardiagn.com



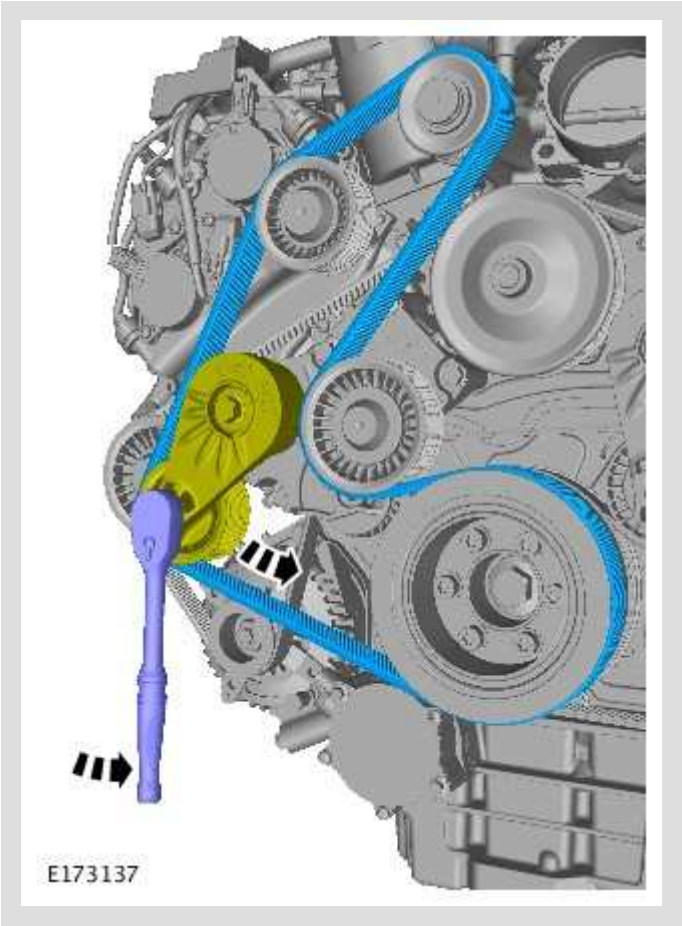
Torque: **48 Nm**

75.

NOTE:

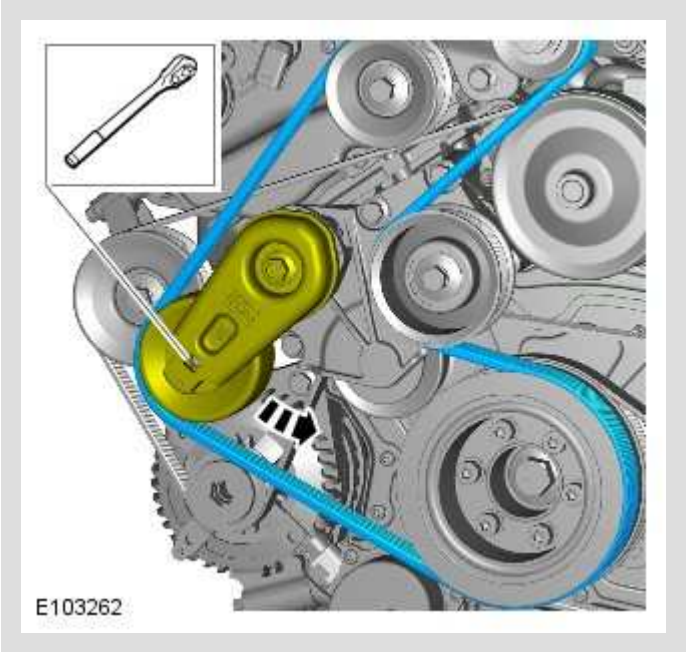
If equipped.

cardiagn.com



76.

cardiagn.com



77. Refer to: Engine (303-01A Engine - V6 S/C 3.0L Petrol, Installation).

78. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

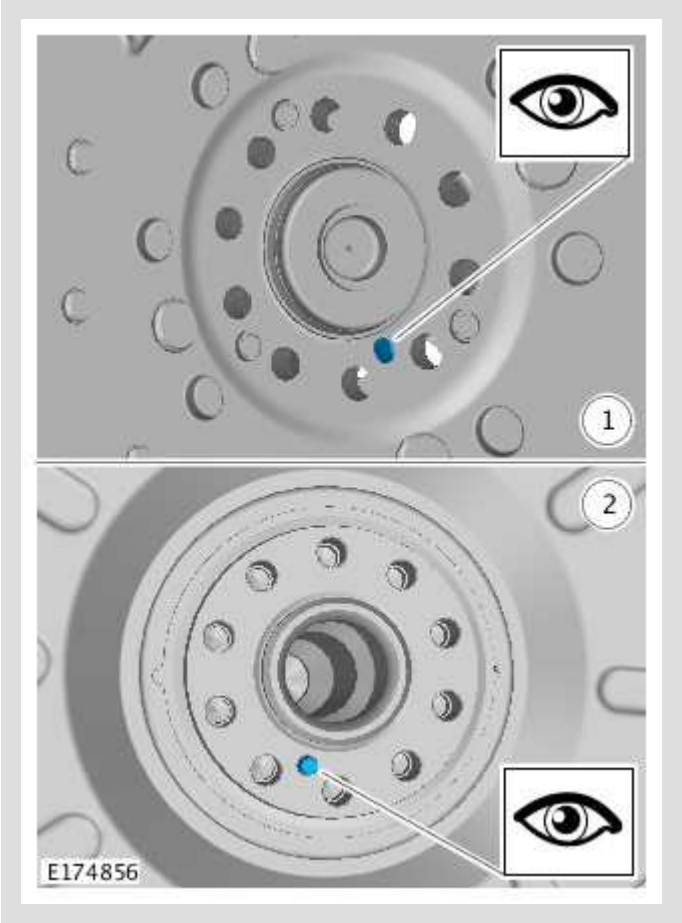
79. Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

Vehicles with manual transmission

1. **NOTE:**

Make sure the crankshaft and flywheel mating faces are clean before installation.

cardiagn.com



Make sure that the flywheel (1) is aligned with the crankshaft dowel (2).

2.

CAUTION:

Make sure that the component is correctly located on the dowel.

cardiagn.com

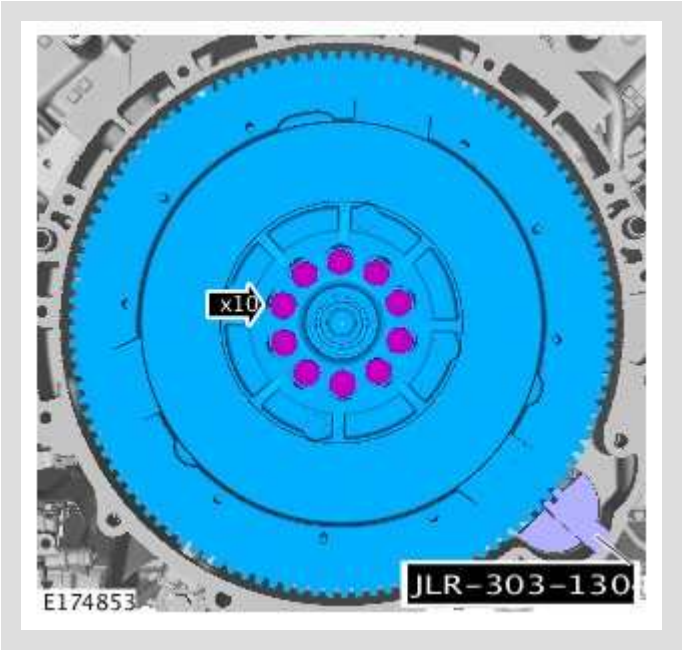
Special Tool(s): JLR-303-1304

3.

CAUTIONS:

- Make sure that new bolts are installed.
- Only tighten the bolts finger tight at this stage.

cardiagn.com



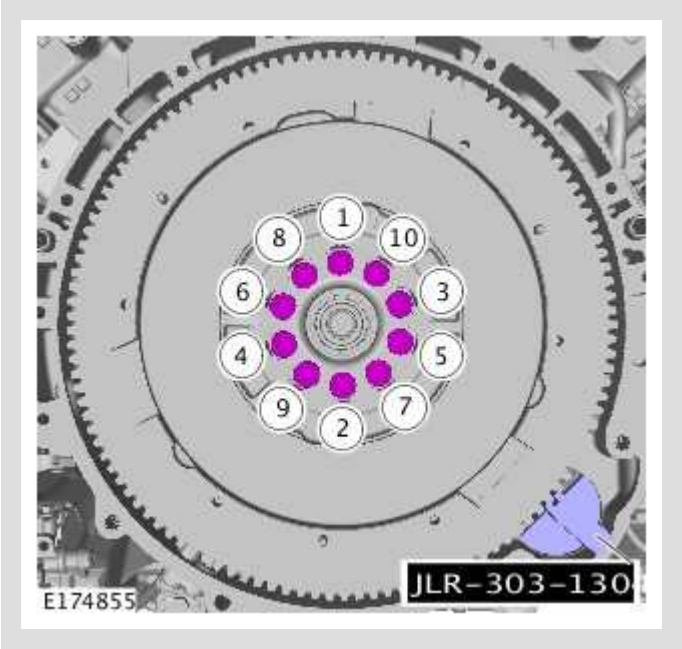
Special Tool(s): JLR-303-1304

4.

CAUTION:

Tighten the bolts in the sequence shown.

cardiagn.com



Special Tool(s): JLR-303-1304

Torque:

Stage 1: **30 Nm**

Stage 2: **120°**

Vehicles with automatic transmission

1.

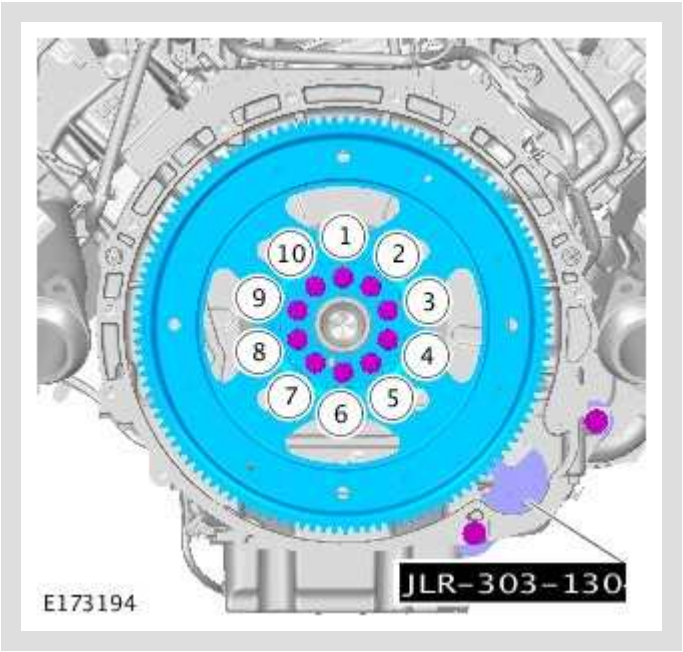
CAUTIONS:

- Install all the bolts finger tight before final tightening.
- The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
- Tighten the bolts in the sequence shown.

NOTES:

cardiagn.com

- Make sure that the crankshaft is not rotated.
- Make sure the crankshaft and flexplate mating faces are clean before installation.



Install the special tool.

Special Tool(s): JLR-303-1304

Torque:

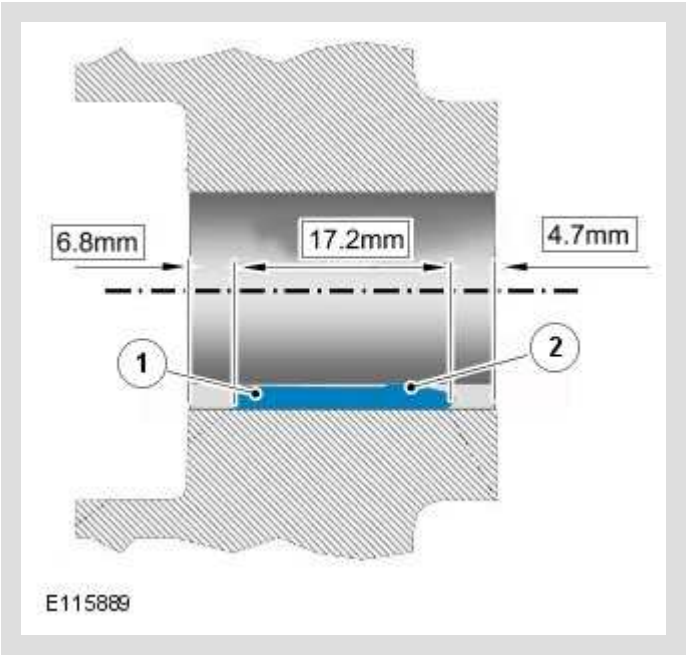
Stage 1: **45 Nm**

Stage 2: **90°**

All vehicles

1.

cardiagn.com



1. Apply RTV sealant to the crankshaft pulley keyway.
1. Make sure that the RTV sealant is applied in a 2mm diameter bead.
1. Make sure that when the RTV sealant is applied that the RTV sealant is level with the top of the keyway.

2.

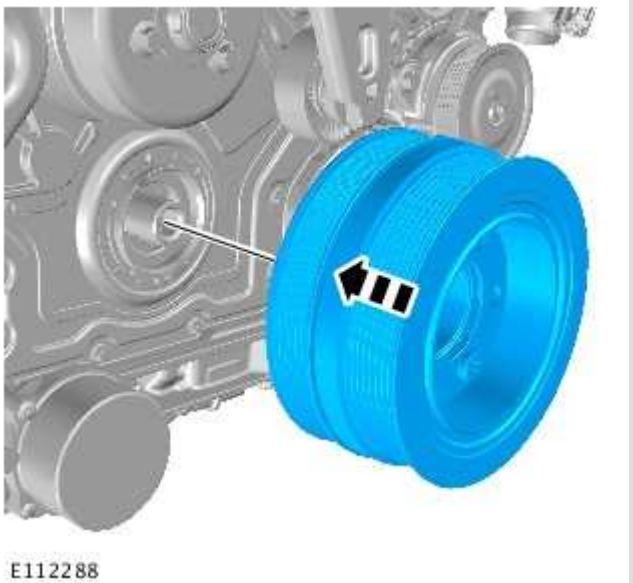
CAUTION:

Install a new friction washer before installing the crankshaft pulley.

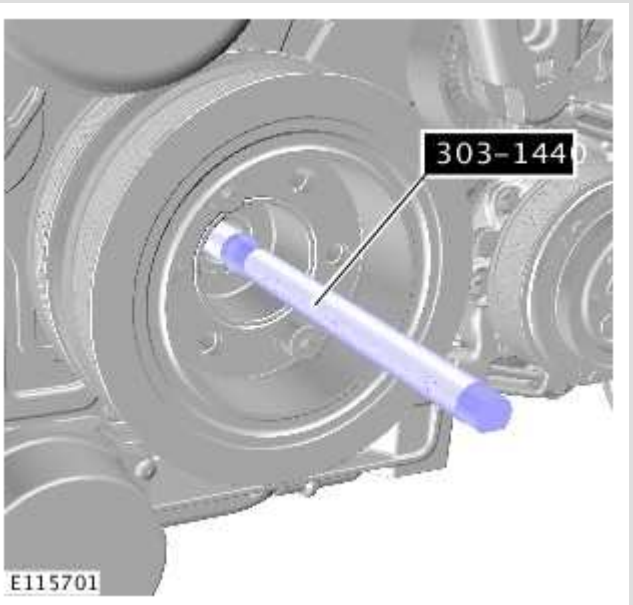
cardiagn.com

NOTE:

Make sure to clean the threads in the end of the crankshaft and that the crank nose is free of any foreign materials.



3.

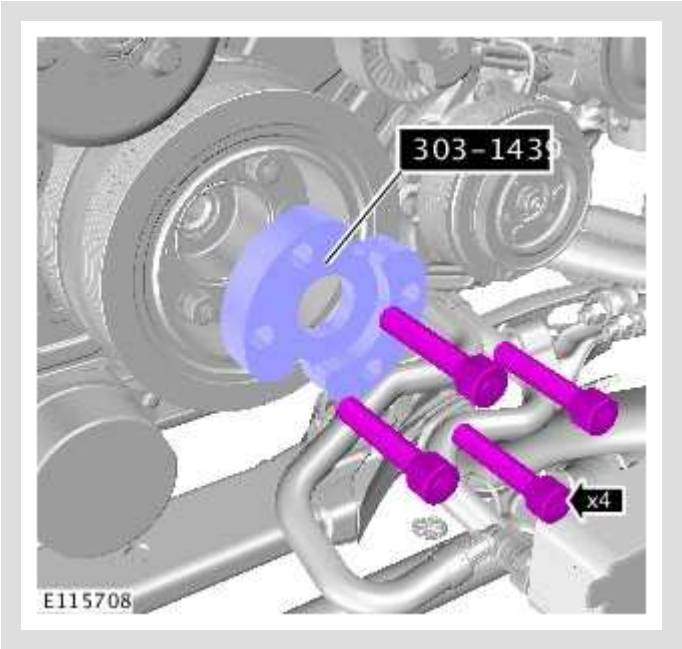


Install the special tool.

Special Tool(s): 303-1440

4.

cardiagn.com

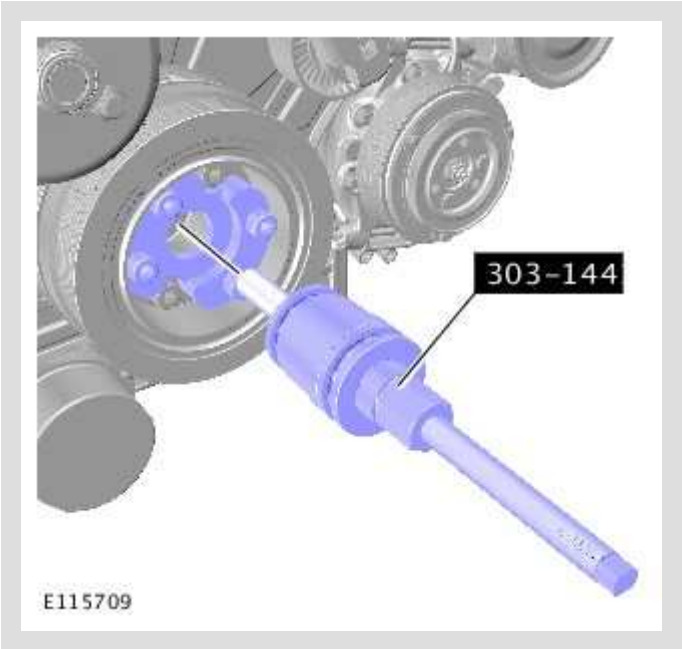


Install the special tool.

Special Tool(s): 303-1439

Torque: **25 Nm**

5.



Install the special tool.

Special Tool(s): 303-1441

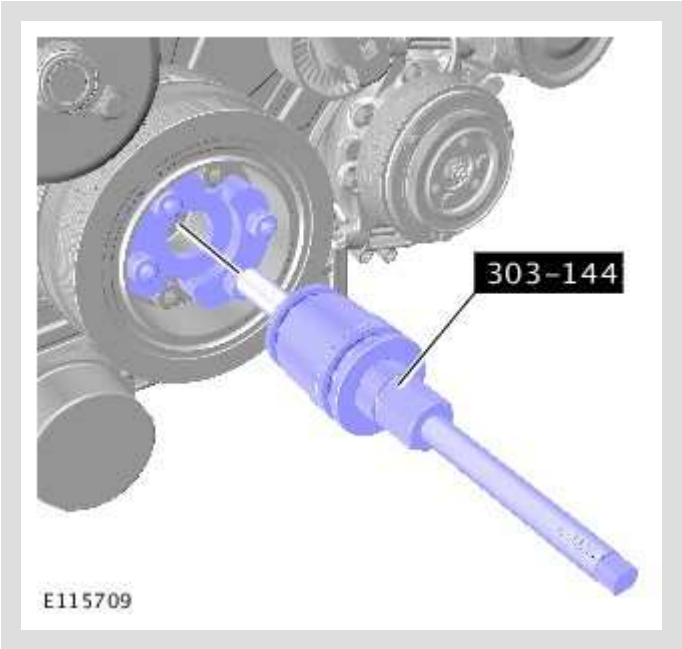
6.

CAUTION:

cardiagn.com

Rotate the crankshaft pulley installation tool until the pulley is fully located, do not over tighten. Failure to do this may result in damage to the components.

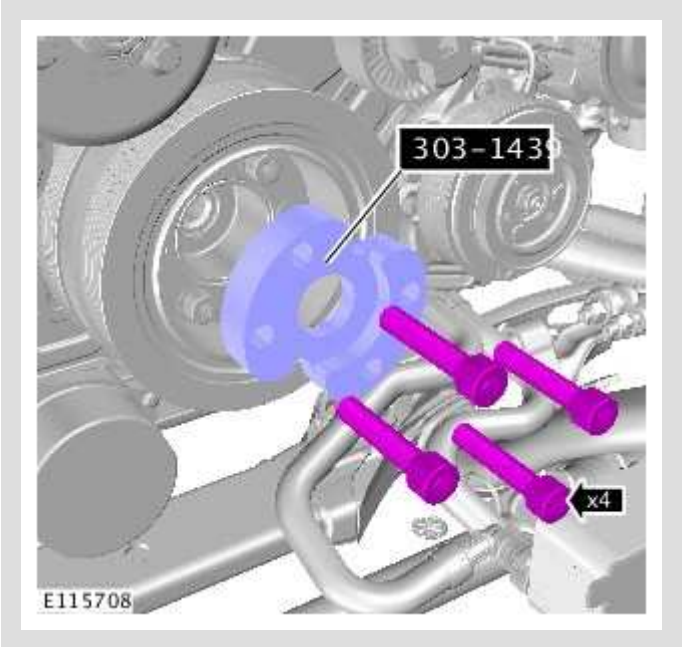
7.



Remove the special tool.
Special Tool(s): 303-1441

8.

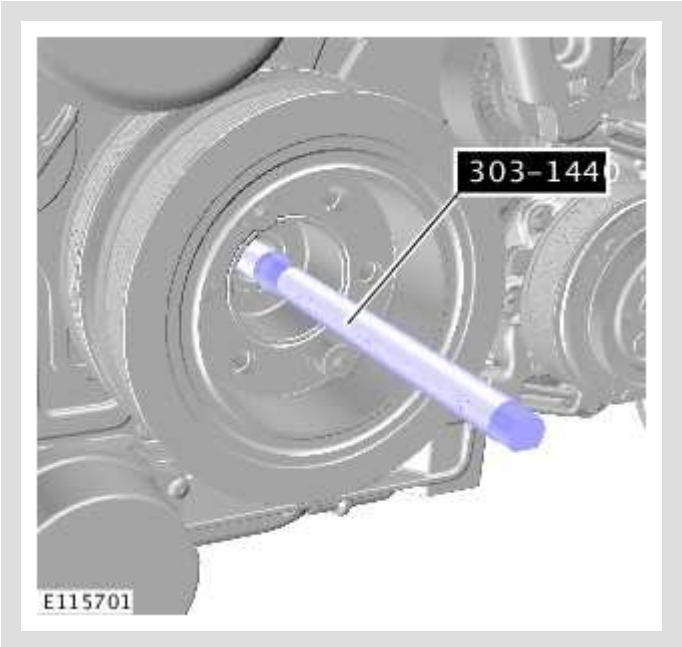
cardiagn.com



Remove the special tool.

Special Tool(s): 303-1439

9.



Remove the special tool.

Special Tool(s): 303-1440

10.

cardiagn.com

Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

11.

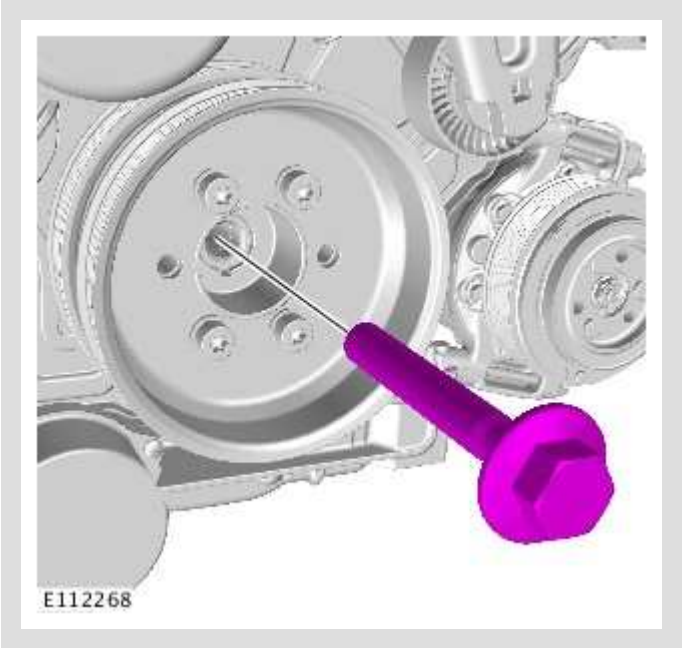
WARNING:

Make sure that a new bolt is installed.

CAUTION:

Tighten the component finger tight first.

cardiagn.com



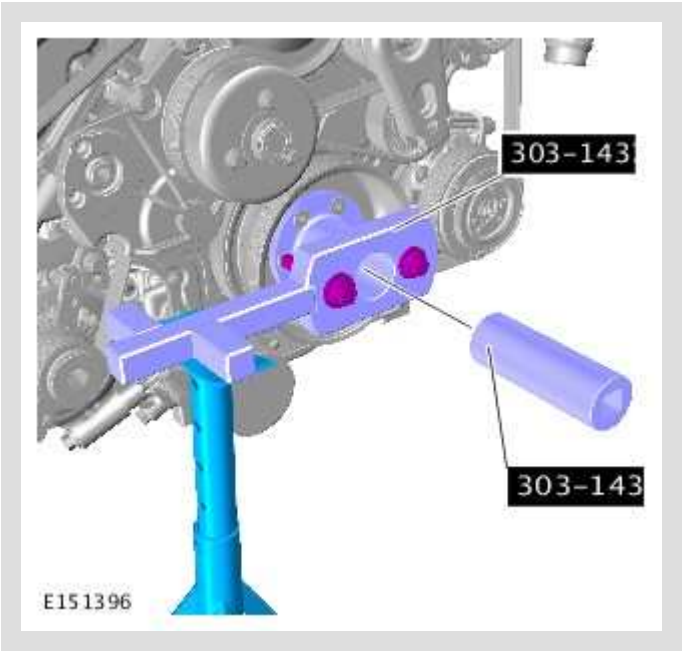
Install the crankshaft pulley bolt.

12.

NOTE:

The graphic shows the step for LH thread only, RH thread will be the opposite.

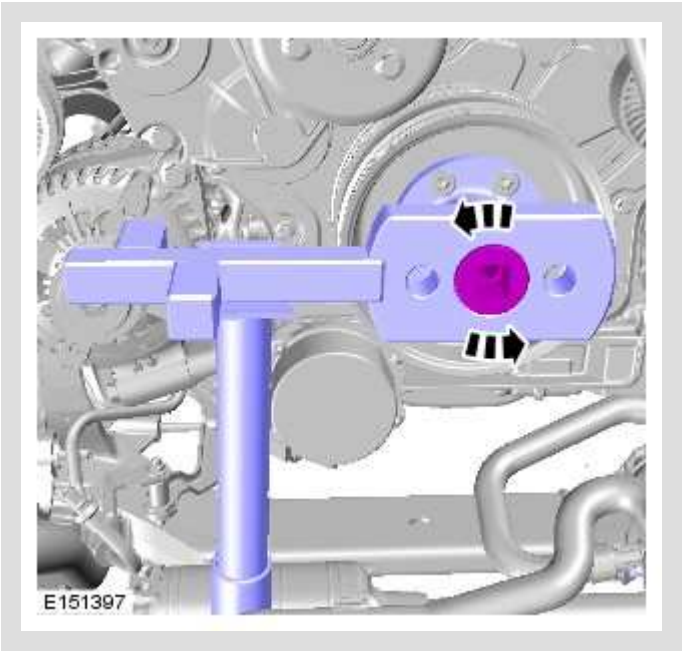
cardiagn.com



Special Tool(s): 303-1438 , 303-1437

Torque: **25 Nm**

13.



Special Tool(s): 303-1438 , 303-1437

cardiagn.com

Torque: **200 Nm**

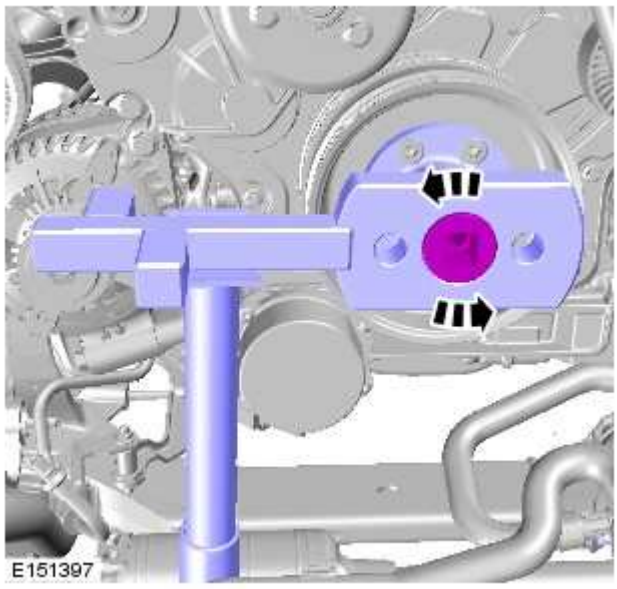
14.

CAUTION:

Make sure that the socket is turned through 270 degrees not the torque wrench.

NOTE:

The use of a torque multiplier capable of 600Nm will be required.

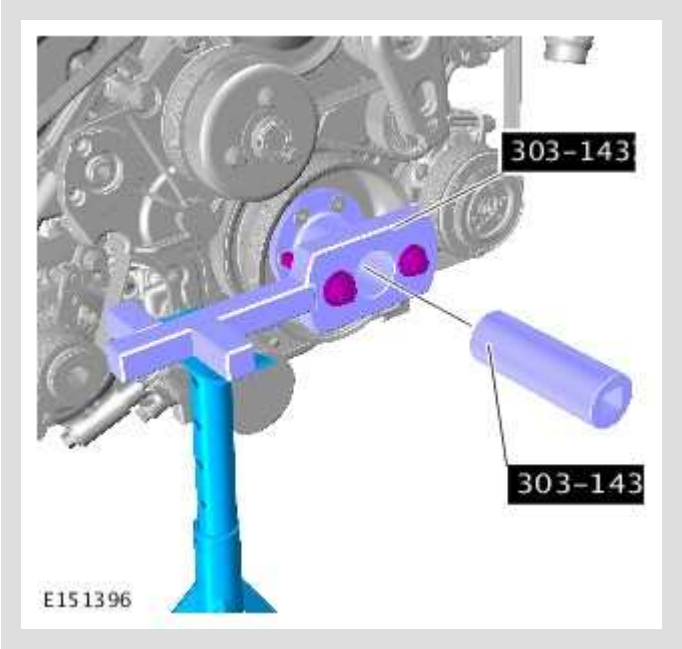


Special Tool(s): 303-1438 , 303-1437

Torque: **270°**

15.

cardiagn.com

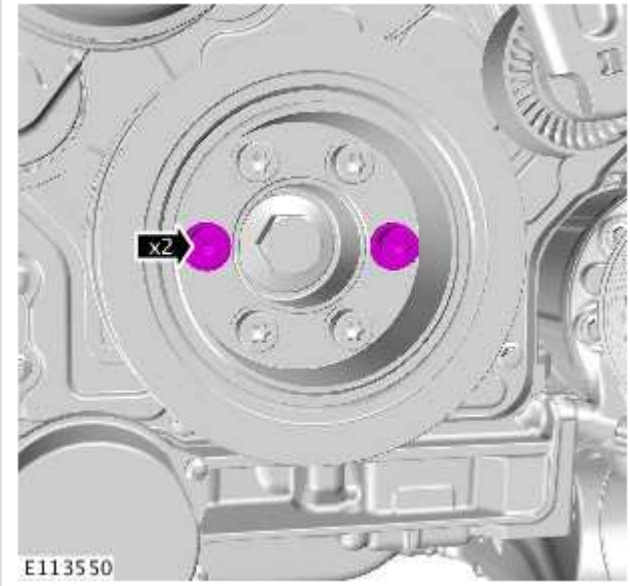


Remove the special tools.

Special Tool(s): 303-1438 , 303-1437

16.

cardiagn.com

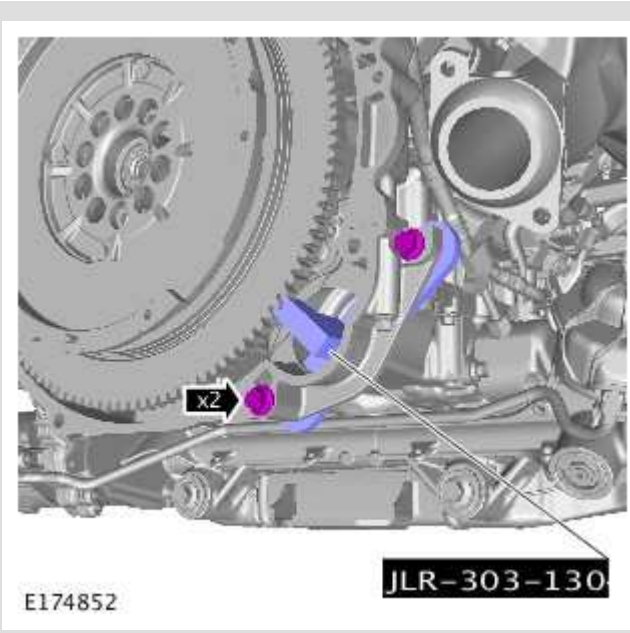


Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

Vehicles with manual transmission

1.



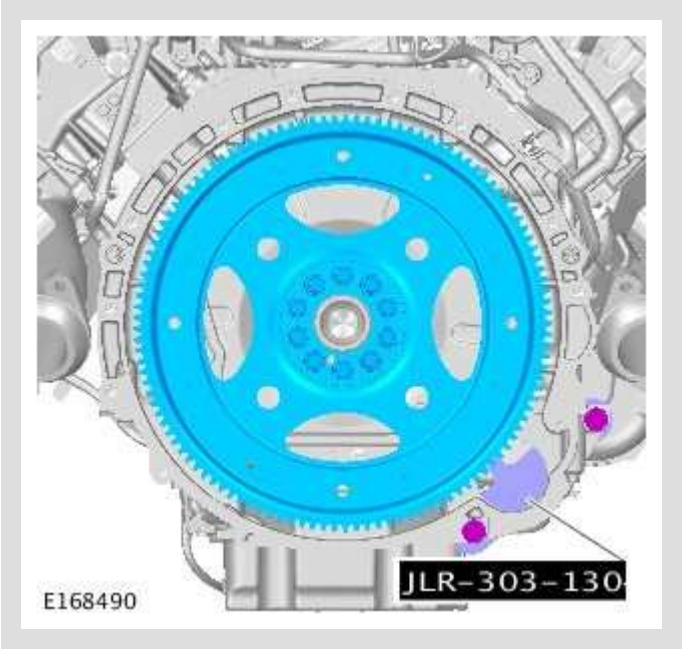
Remove the special tool.

Special Tool(s): JLR-303-1304

Vehicles with automatic transmission

cardiagn.com

1.

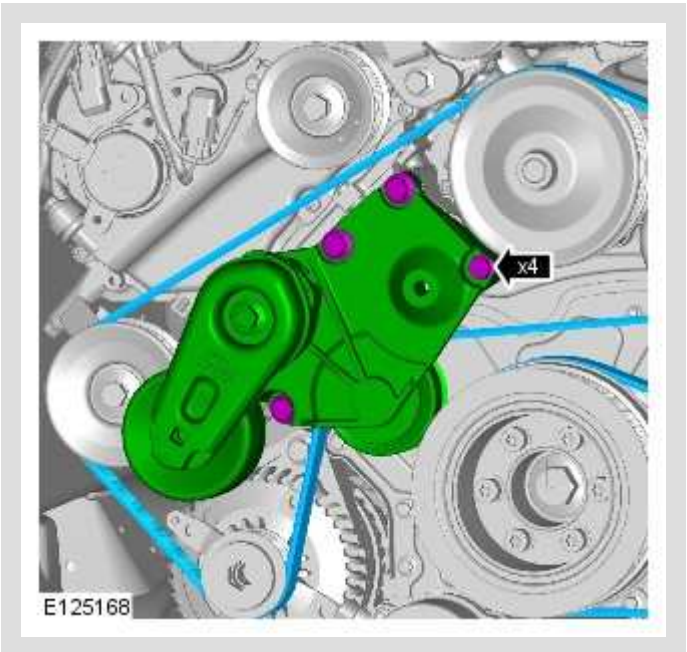


Remove the special tool.

Special Tool(s): JLR-303-1304

All vehicles

1.



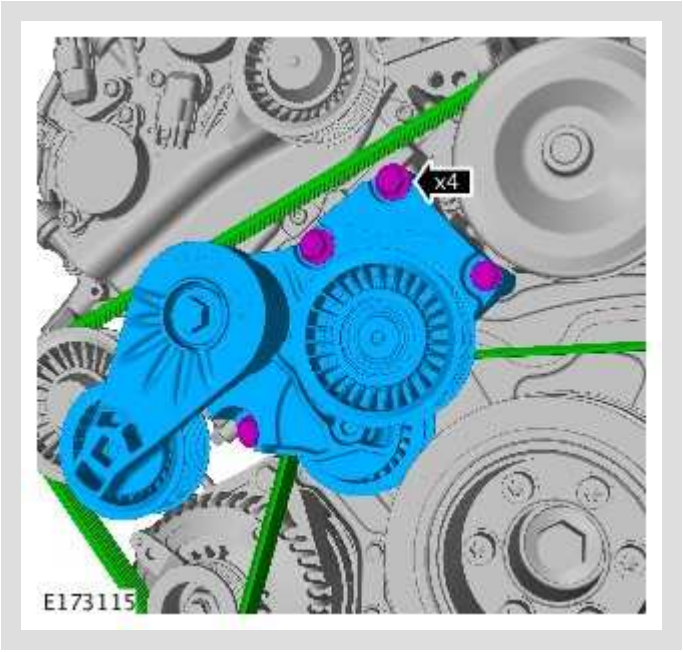
Torque: **25 Nm**

2.

NOTE:

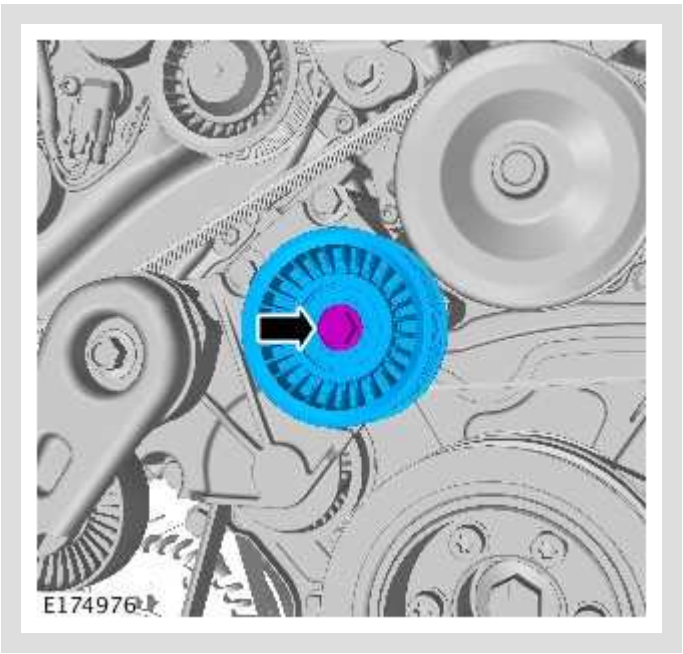
If equipped.

cardiagn.com



Torque: **25 Nm**

3.



Torque: **48 Nm**

4.

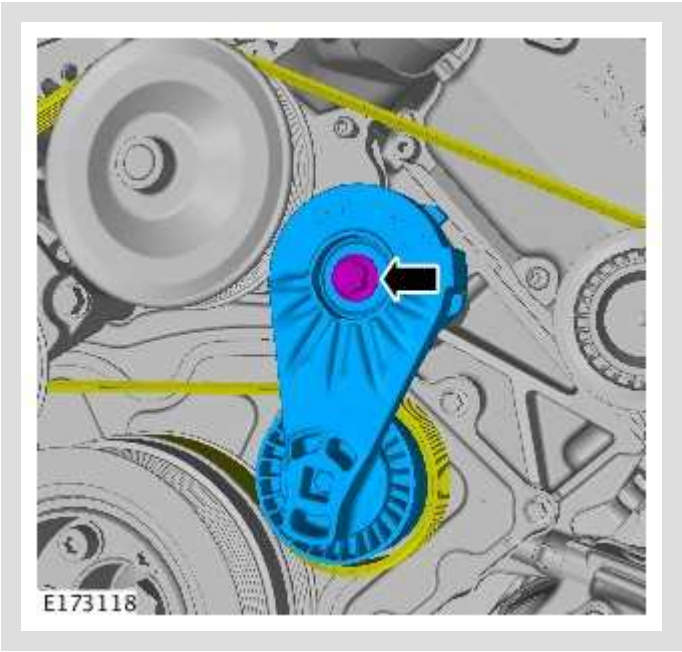
cardiagn.com

5.

NOTE:

If equipped.

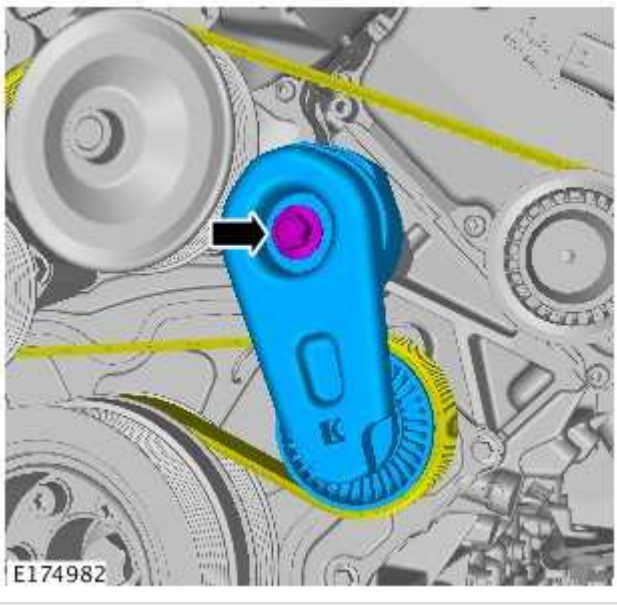
cardiagn.com



Torque: **48 Nm**

6.

cardiagn.com

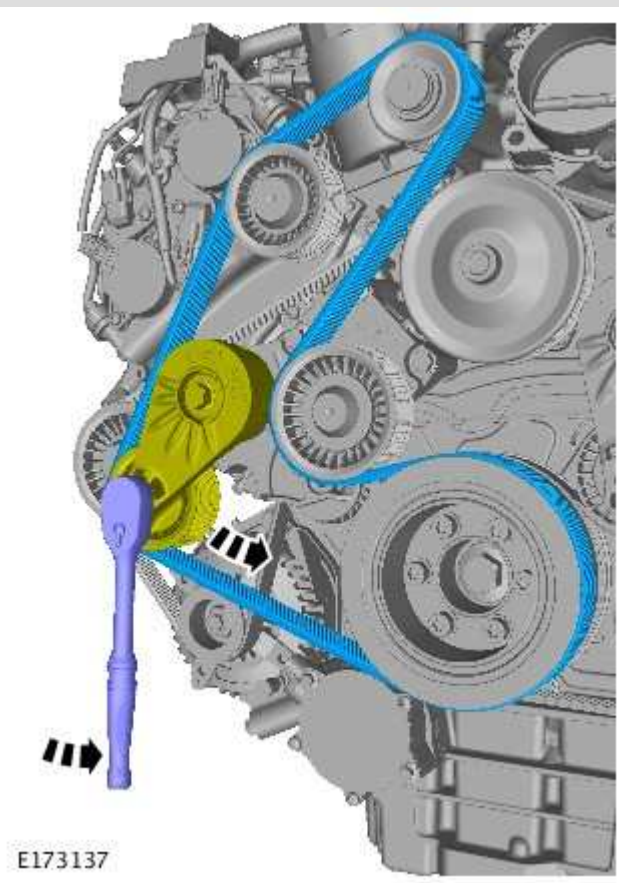


Torque: **48 Nm**

7.

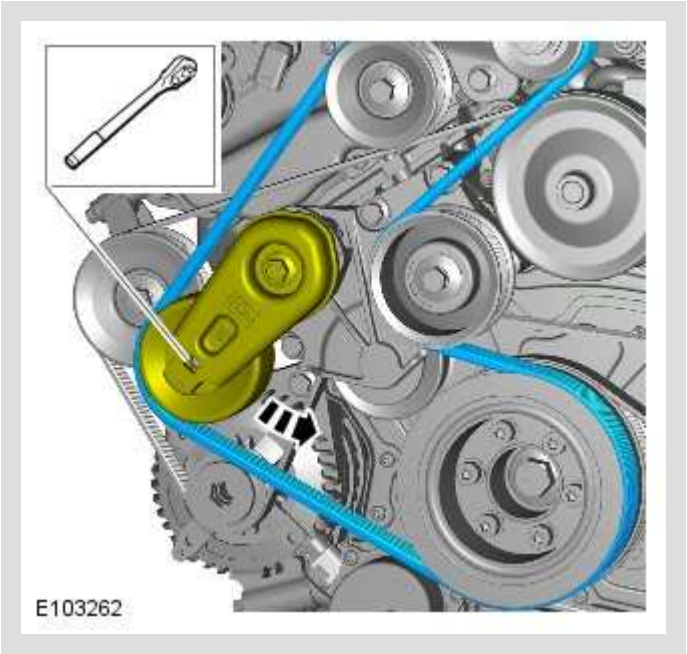
NOTE:

If equipped.



cardiagn.com

8.



9. Refer to: Engine (303-01A Engine - V6 S/C 3.0L Petrol, Installation).

10. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

11. Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

ENGINE MOUNT LH (G1584107)

REMOVAL AND INSTALLATION

12.45.01	ENGINE MOUNTING - LEFT HAND - RENEW	RIGHT HAND DRIVE	0.7	USED WITHINS	

REMOVAL

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.

All vehicles

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2.

cardiagn.com

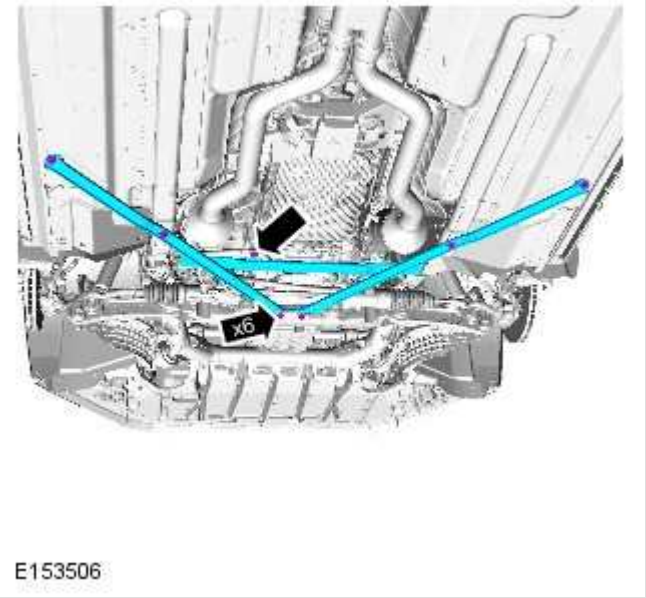
WARNING:

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

3. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

4.



Torque: **55 Nm**

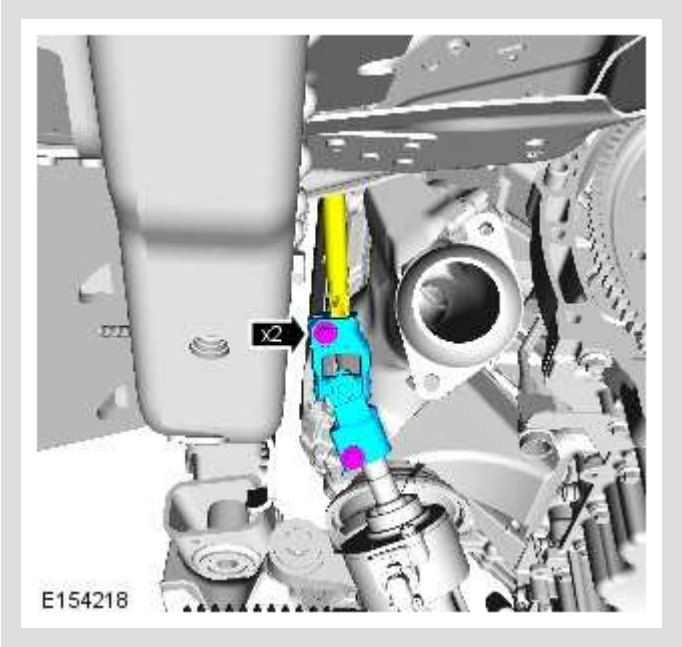
Left-hand drive vehicles

1.

CAUTIONS:

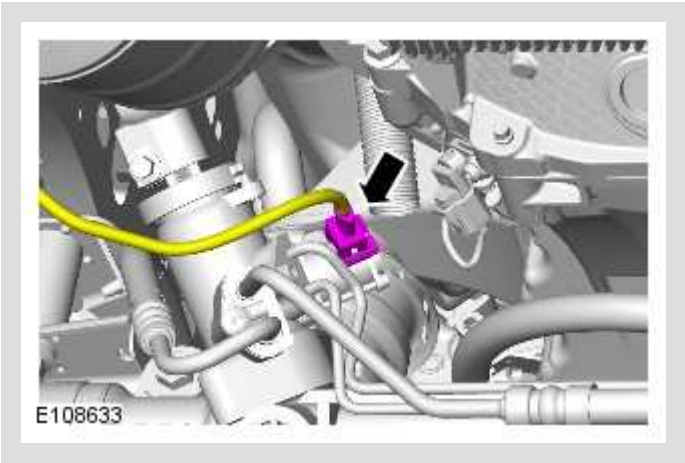
- Discard the bolts.
- Make sure that new bolts are installed.

cardiagn.com



Torque: **35 Nm**

2.



3.

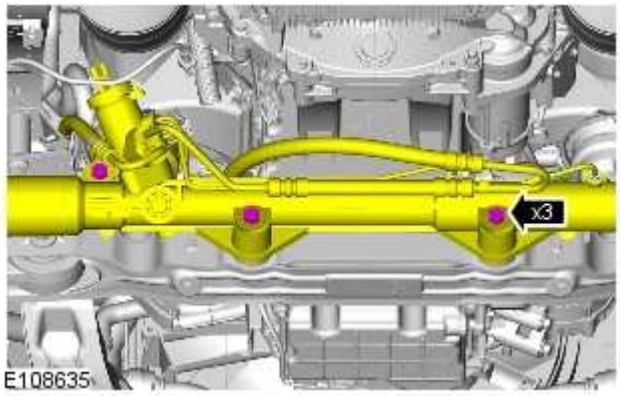
CAUTION:

Make sure that the component is not suspended by the fluid hoses.

cardiagn.com

NOTE:

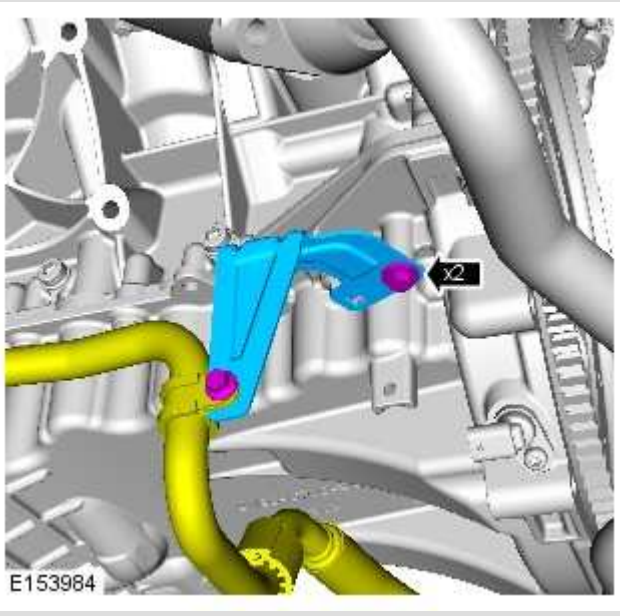
Make sure to support the steering gear.



Torque: **100 Nm**

All vehicles

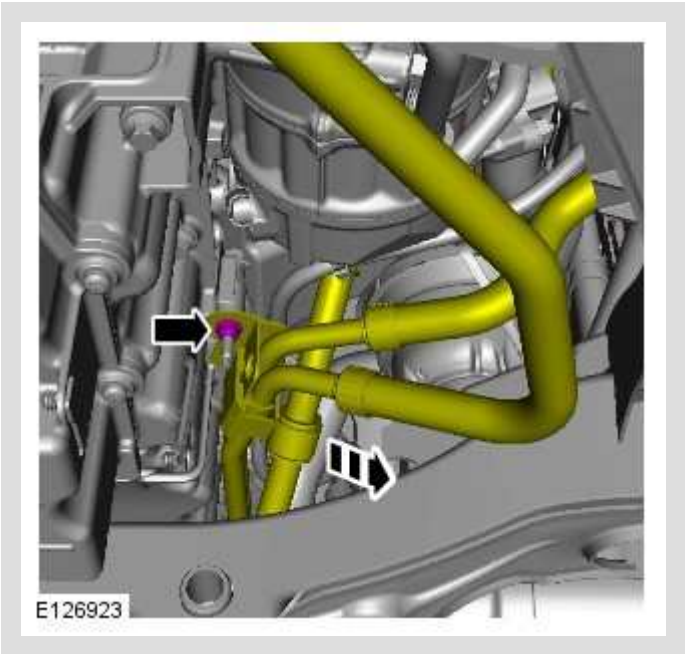
1.



Torque: **10 Nm**

2.

cardiagn.com

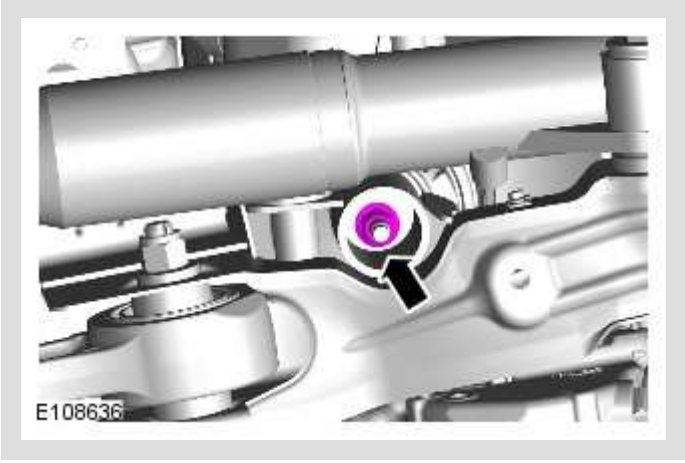


Torque: **10 Nm**

3.

NOTES:

- Remove and discard the nut.
- Make sure that a new nut is installed.



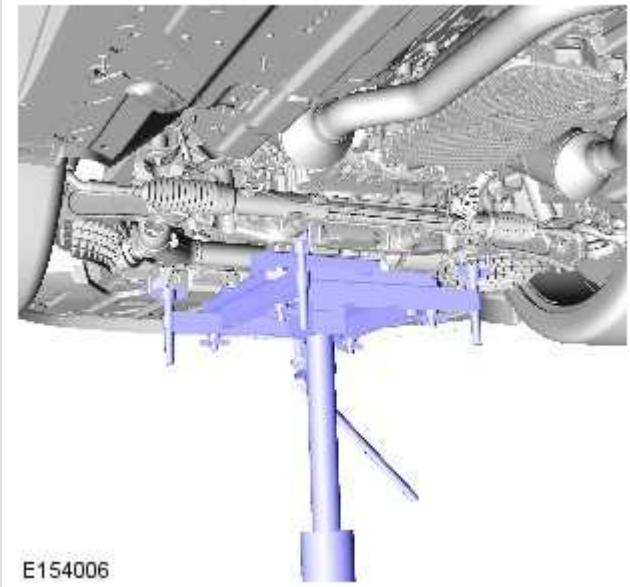
Torque: **63 Nm**

cardiagn.com

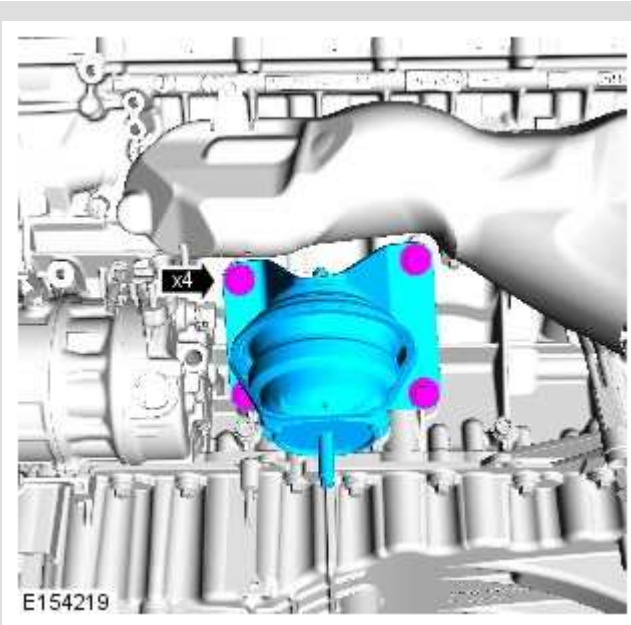
4.

CAUTIONS:

- Support the engine on a jack. The angle may need to be adjusted during this procedure.
- Use a wooden block to protect the oil pan when supporting the engine.



5.



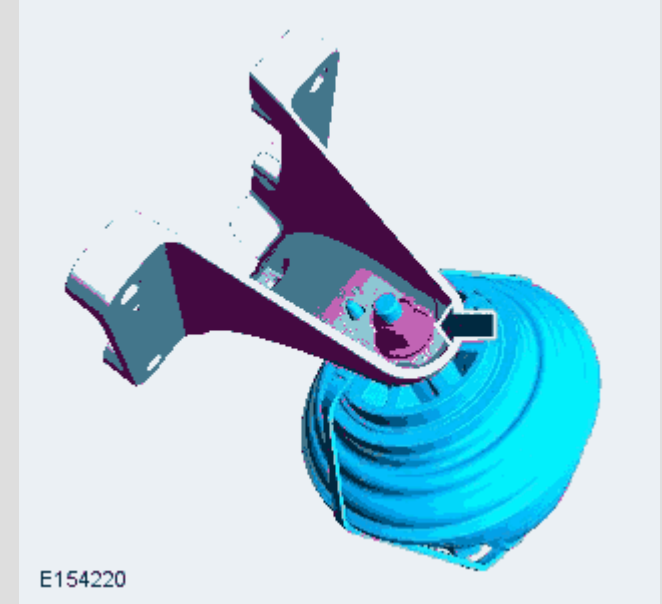
Torque: **48 Nm**

cardiagn.com

6.

NOTE:

Do not disassemble further if the component is removed for access only.



NOTES:

Remove and discard the nut.

Make sure that a new nut is installed.

Torque: **48 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

2015.0 F-TYPE (X152), 501-02

FRONT END BODY PANELS

AIR DEFLECTOR (G1580212)

REMOVAL AND INSTALLATION

76.11.41	ENGINE UNDERTRAY - RENEW	ALL DERIVATIVES	0.2	USED WITHINS
76.11.41	ENGINE UNDERTRAY - RENEW	PROJECT 7	0.2	USED WITHINS

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1.

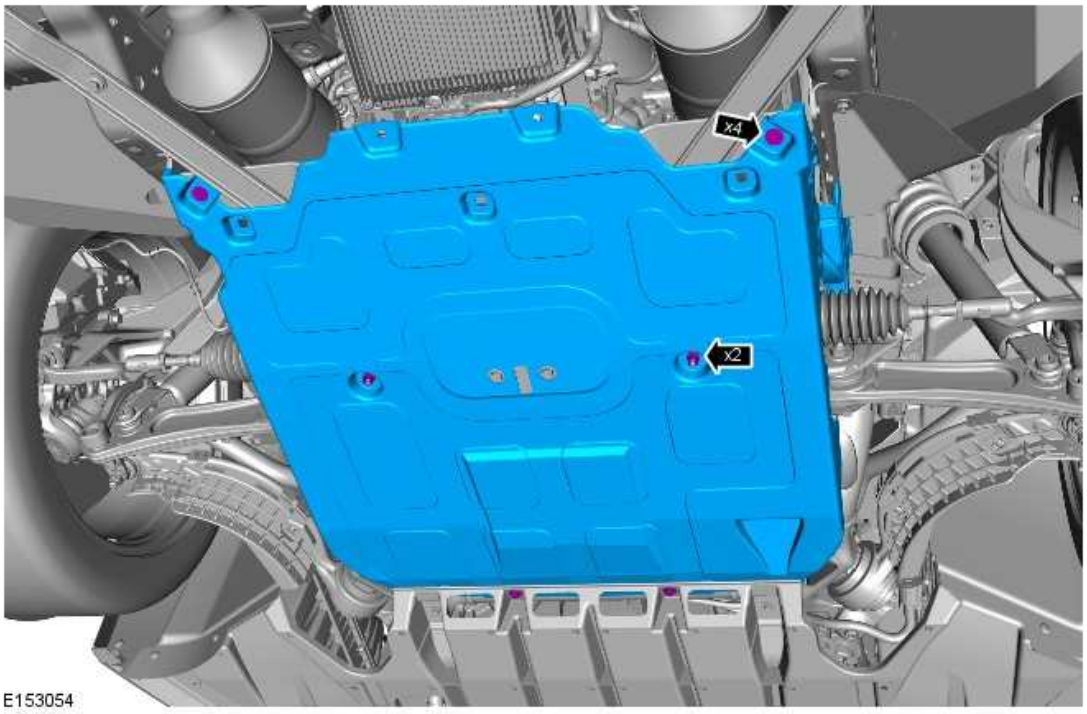
WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2.

cardiagn.com



Torque:

Nuts and rear bolts **4.1 Nm**

Front bolts **9 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

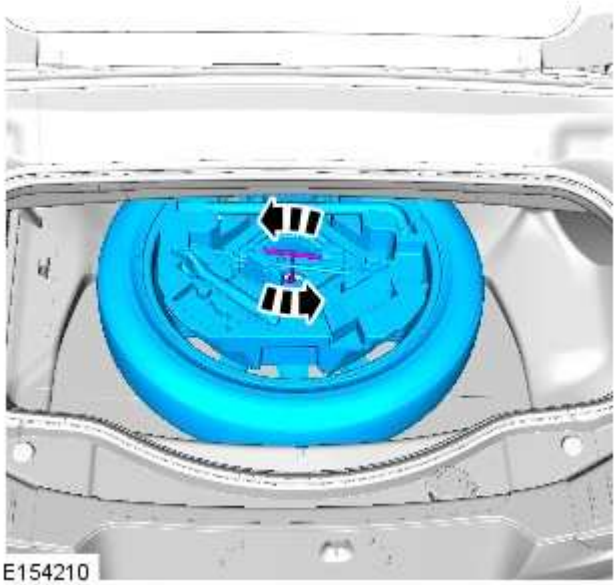
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

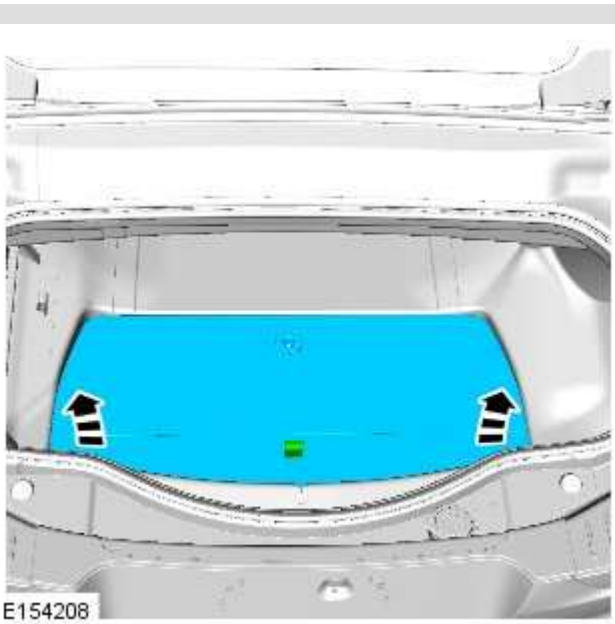
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

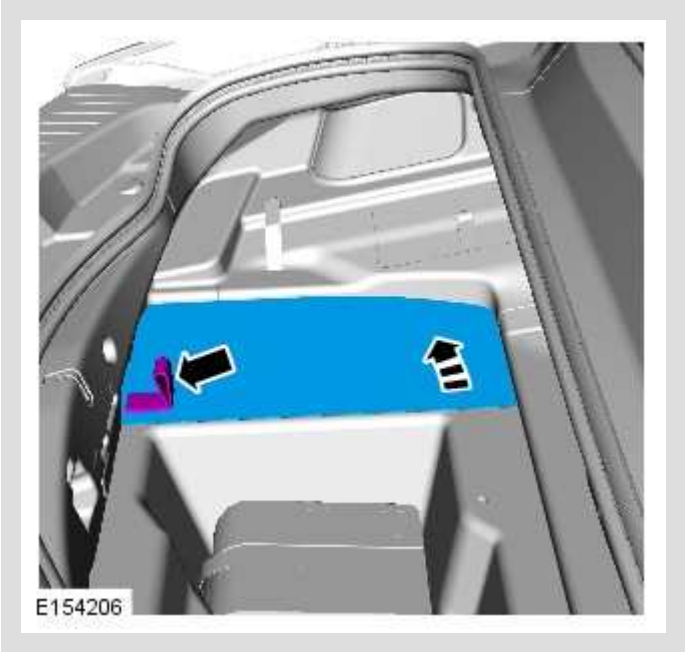

E154210

4.


E154208

5.

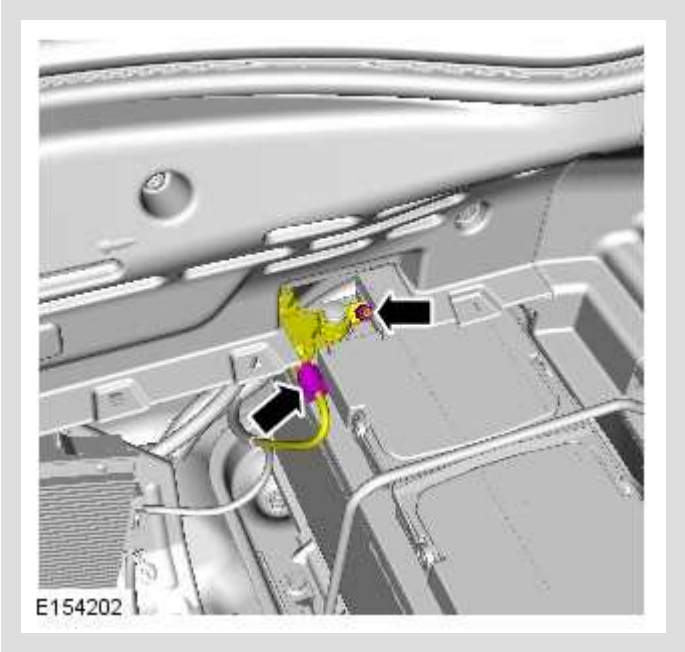
cardiagn.com



6.

CAUTION:

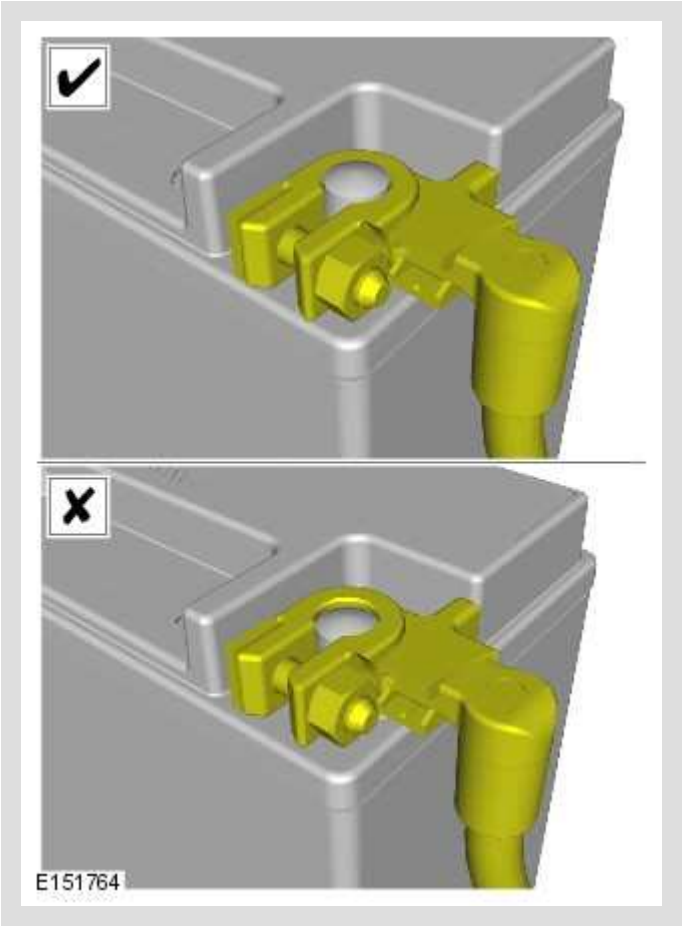
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

ENGINE MOUNT RH (G1584108)

REMOVAL AND INSTALLATION

12.45.03	ENGINE MOUNTING - RIGHT HAND - RENEW	RIGHT HAND DRIVE	0.8	USED WITHINS	

REMOVAL

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.

All vehicles

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2.

cardiagn.com

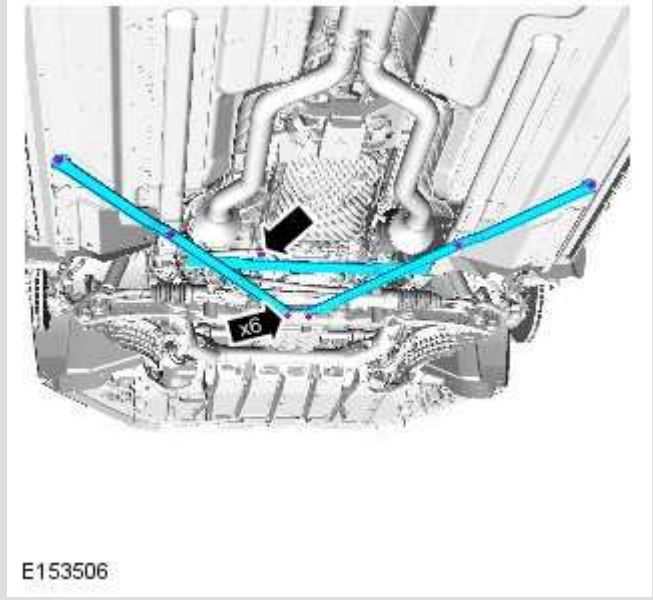
WARNING:

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

3. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

4.



Torque: **55 Nm**

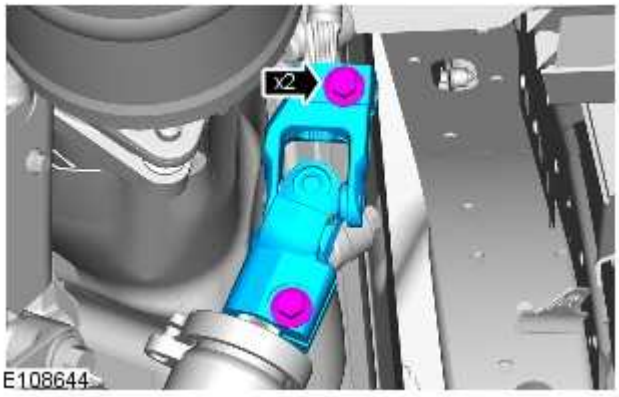
Right-hand drive vehicles

1.

CAUTIONS:

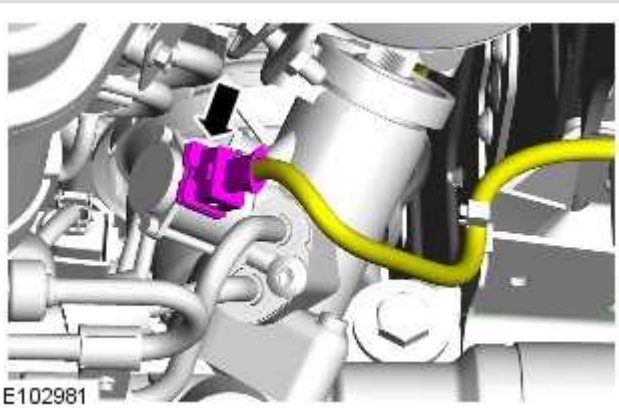
- Discard the bolts.
- Make sure that new bolts are installed.

cardiagn.com

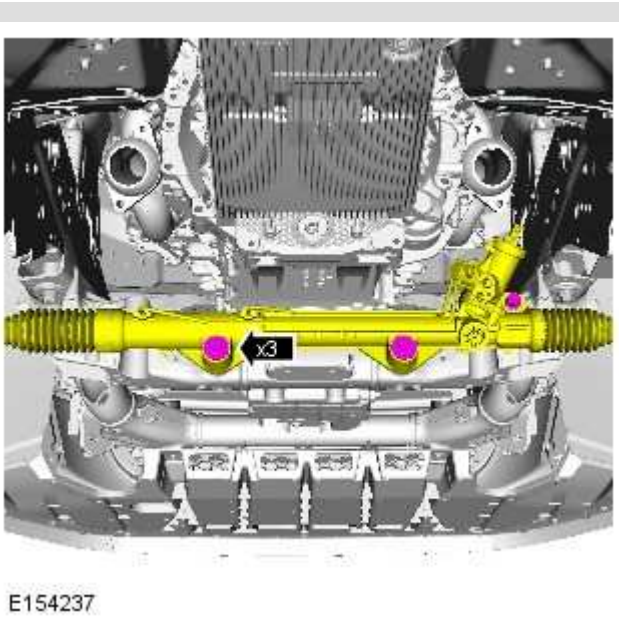


Torque: **35 Nm**

2.



3.



cardiagn.com

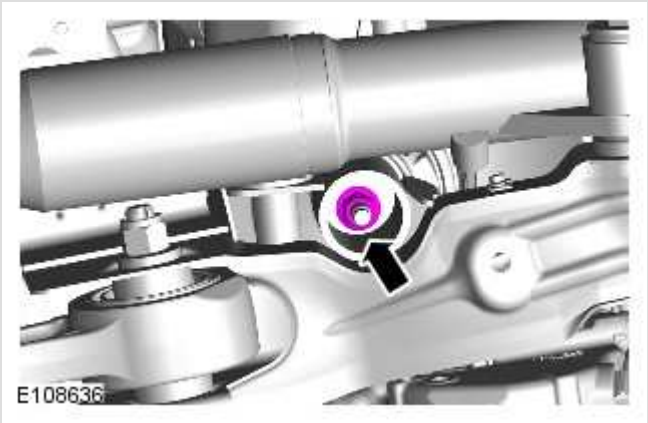
Torque: **100 Nm**

All vehicles

1.

NOTES:

- Remove and discard the nut.
- Make sure that a new nut is installed.



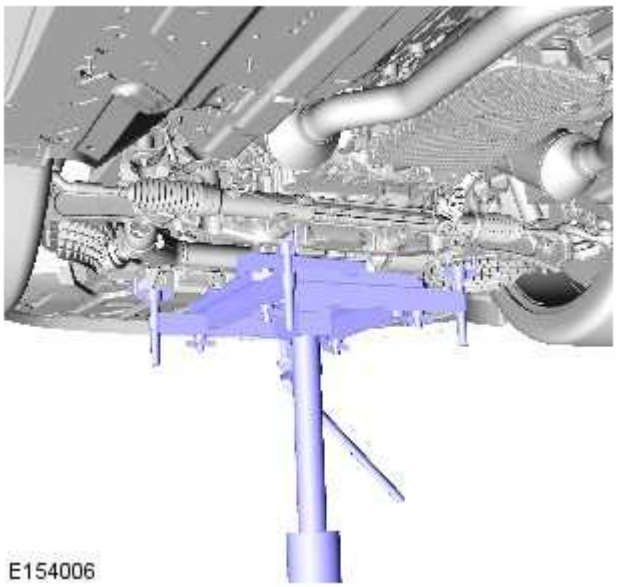
Torque: **63 Nm**

2.

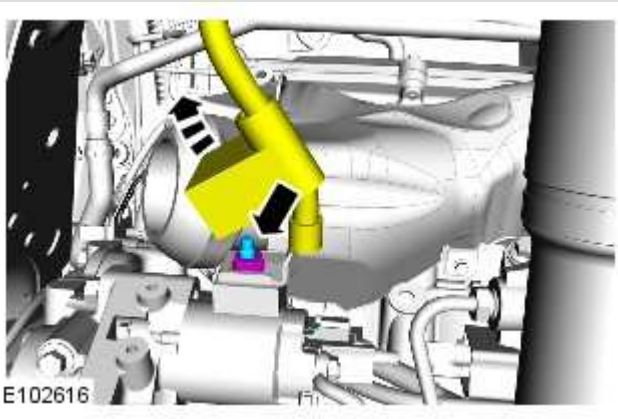
CAUTIONS:

- Support the engine on a jack. The angle may need to be adjusted during this procedure.
- Use a wooden block to protect the oil pan when supporting the engine.

cardiagn.com



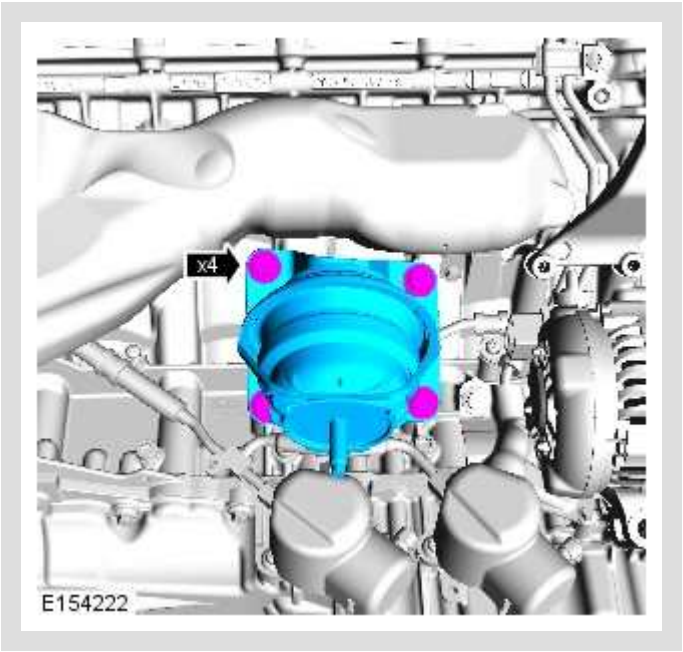
3.



Torque: **12 Nm**

4.

cardiagn.com



Torque: **48 Nm**

5.

NOTES:

- Do not disassemble further if the component is removed for access only.
- Remove and discard the nut.
- Make sure that a new nut is installed.

cardiagn.com

Torque: **48 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

AIR DEFLECTOR (G1580212)

REMOVAL AND INSTALLATION

76.11.41	ENGINE UNDERTRAY - RENEW	ALL DERIVATIVES	0.2	USED WITHINS	

76.11.41	ENGINE UNDERTRAY - RENEW	PROJECT 7	0.2	USED WITHINS	

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1.

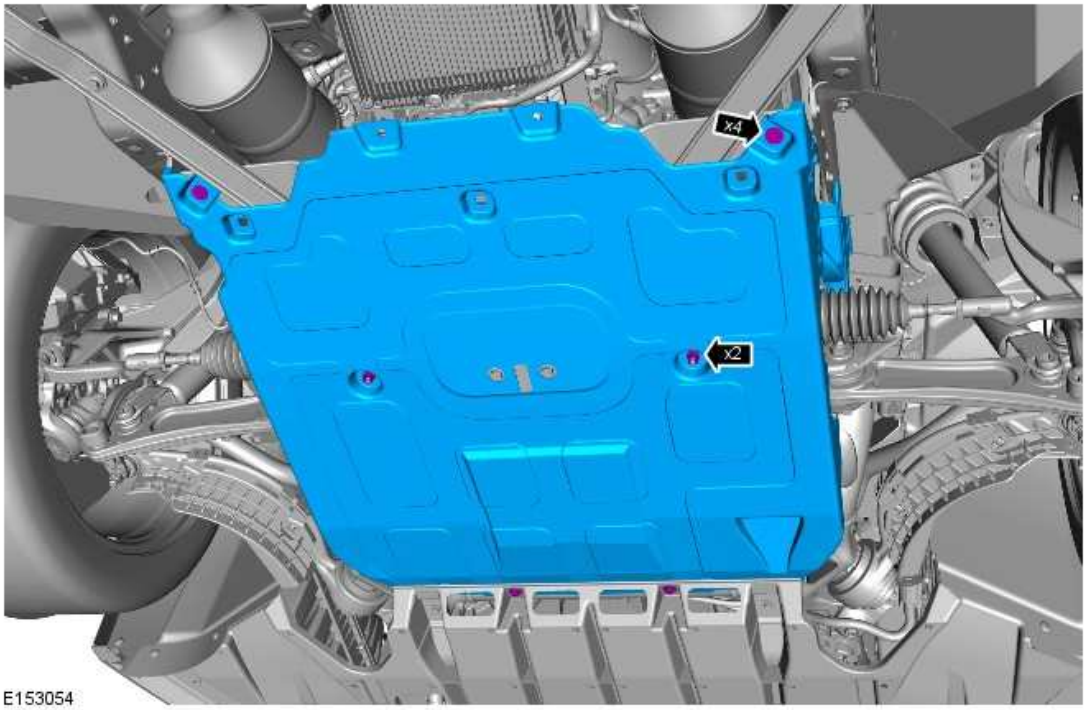
WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2.

cardiagn.com



Torque:

Nuts and rear bolts **4.1 Nm**

Front bolts **9 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

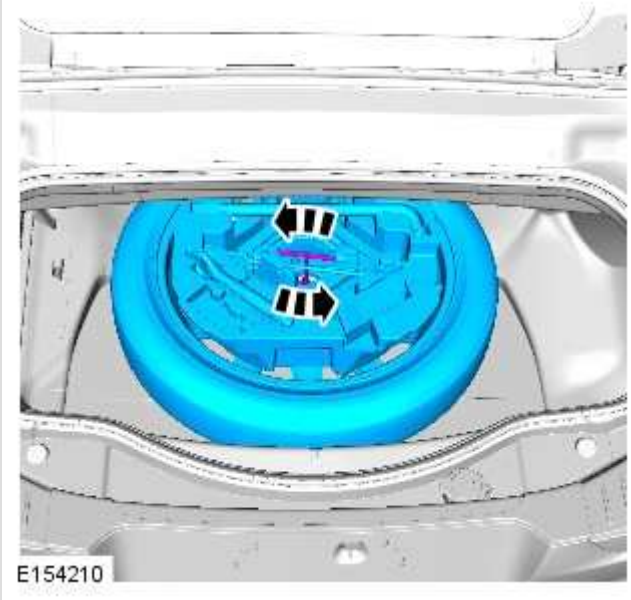
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

△ NOTES:

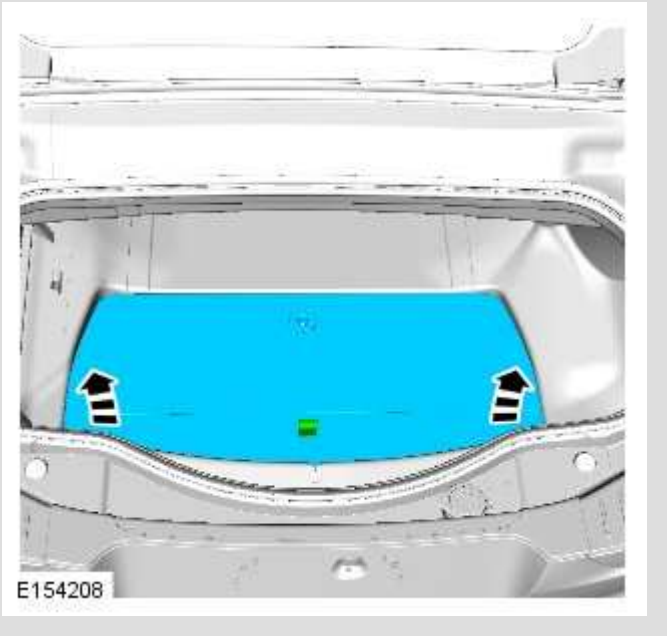
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

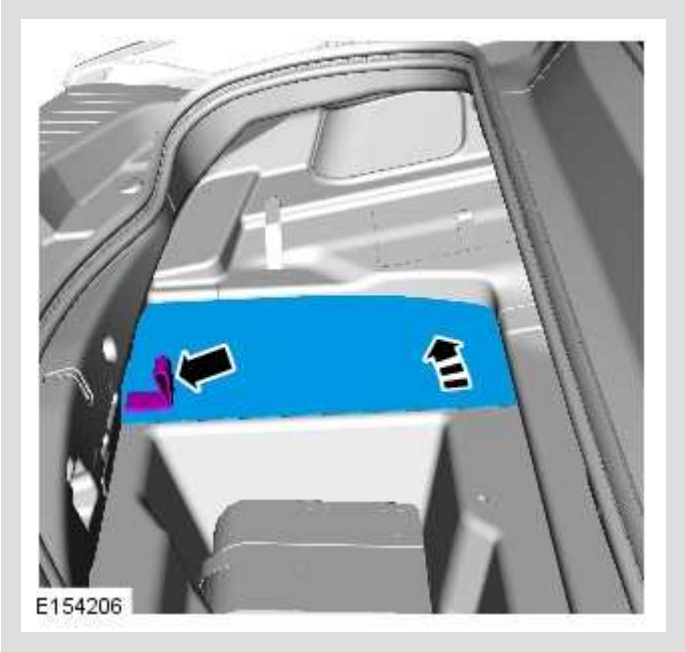


4.



5.

cardiagn.com

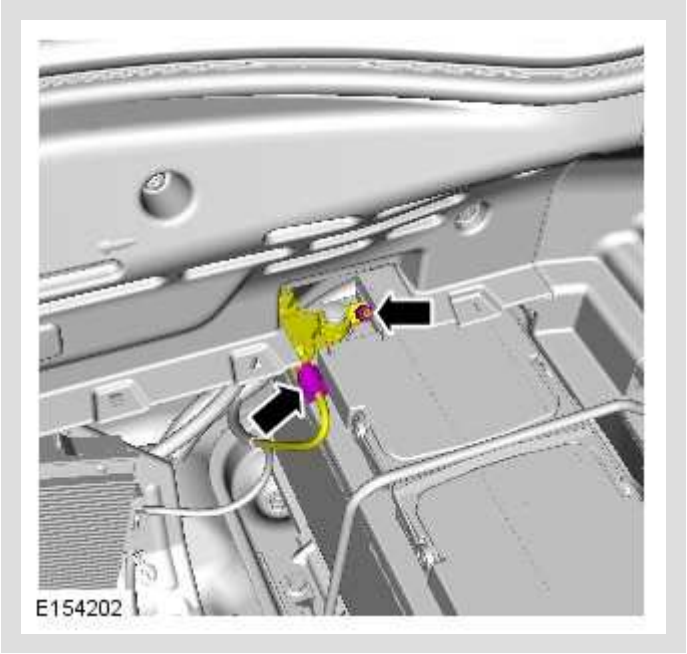


6.

CAUTION:

Take extra care not to damage the wiring harnesses.

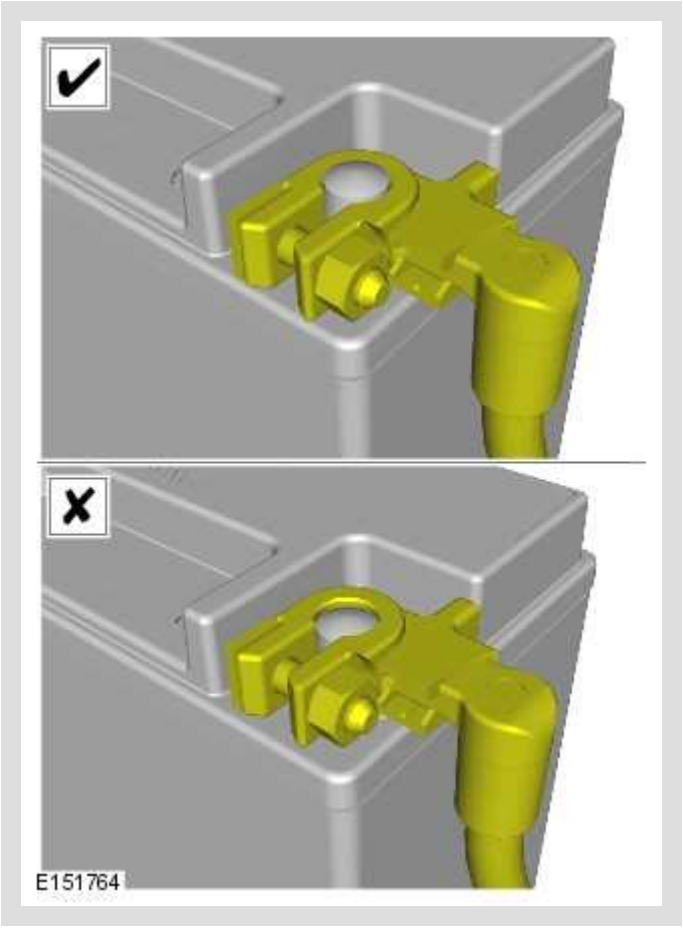
cardiagn.com



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9.

cardiagn.com

NOTE:

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization
11. Enter the audio unit preset radio frequencies.
12. Reset the clock to the correct time.
13. Start the engine and allow to idle until the engine reaches normal operating temperature.
14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

ENGINE OIL DRAINING AND FILLING (G1586896)

GENERAL PROCEDURES

12.60.07	ENGINE OIL - DRAIN AND REFILL	ALL DERIVATIVES	0.5	USED WITHINS

DRAINING

WARNING:

The spilling of hot engine oil is unavoidable during this procedure, care must be taken to prevent scalding.

NOTES:

- Clean the components general area prior to dismantling.
- Some variation in the illustrations may occur, but the essential information is always correct.

1.

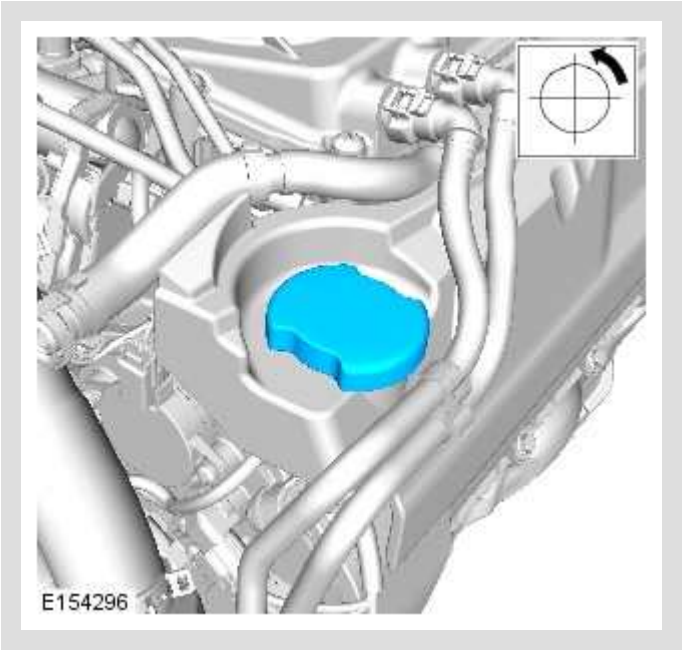
CAUTION:

Make sure the engine is warm.

cardiagn.com

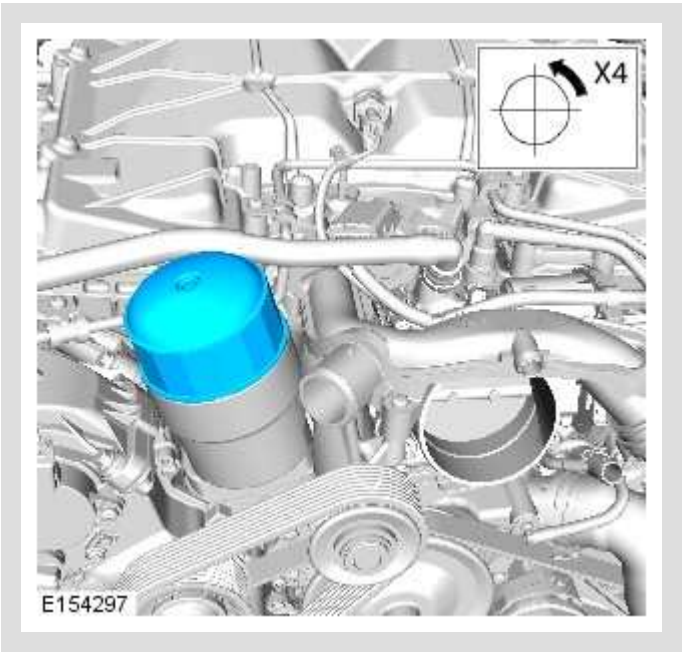
Start the engine and allow to run for 10 minutes, stop the engine.

2.



3. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

4.



Loosen the element cover 4 complete turns to allow engine oil to drain from the filter cover.

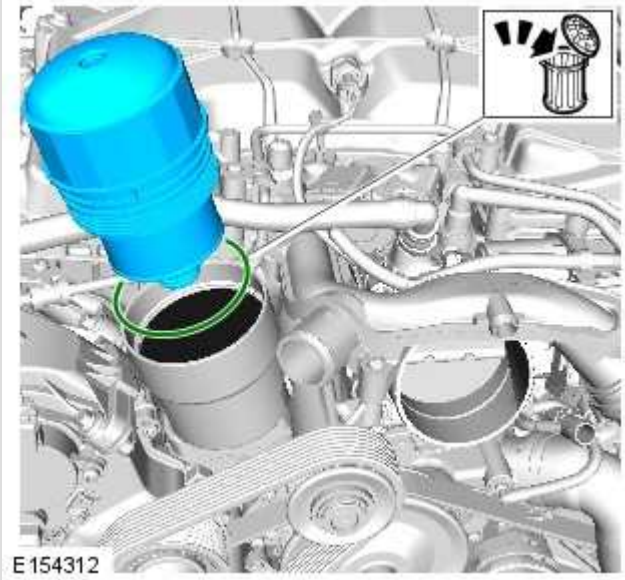
Make sure that the O-ring seal is exposed.

cardiagn.com

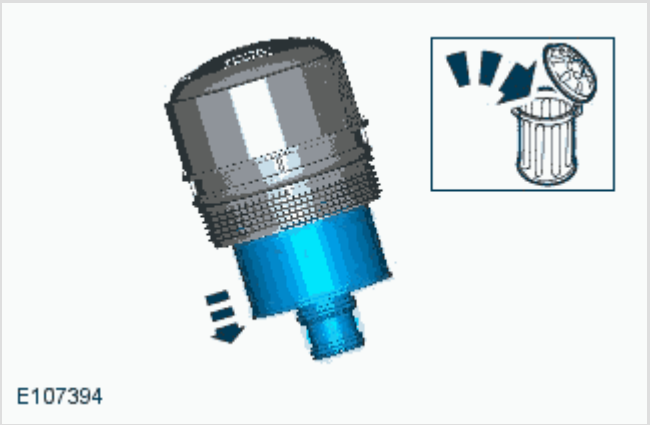
5.

NOTES:

- Allow 10 minutes for the engine oil to drain from the oil filter housing.
- Remove and discard the O-ring seal.
- Position cloth to collect fluid spillage, make sure fluid does not come in to contact with the accessory drive belts.



6.



Remove and discard the oil filter element.

7.

cardiagn.com

WARNING:

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

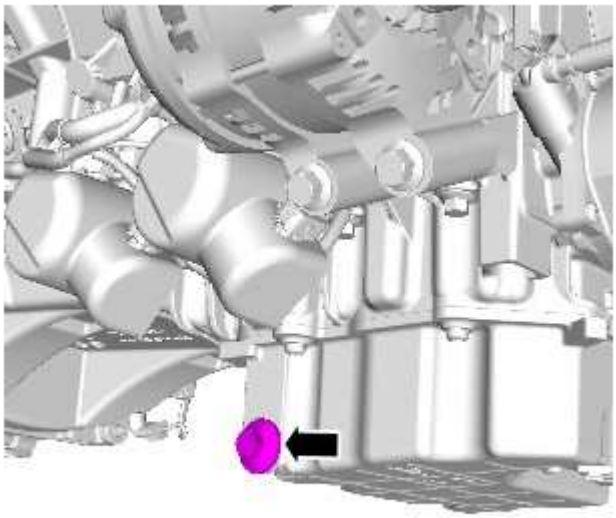
8. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

9. **CAUTIONS:**

- Be prepared to collect escaping oil.
- Allow at least 10 minutes for the engine oil to drain.

NOTE:

Discard the oil pan drain plug.



E154299

cardiagn.com

FILLING

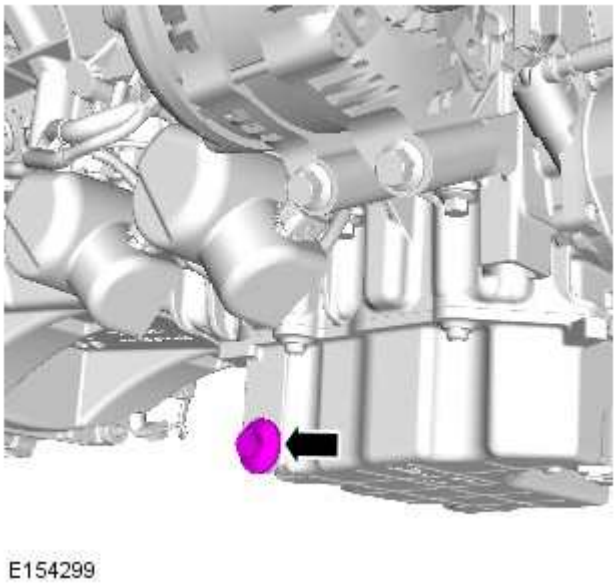
1.

CAUTION:

Make sure that the area around the component is clean and free of foreign material.

NOTE:

Install a new oil pan drain plug.



Torque: **24 Nm**

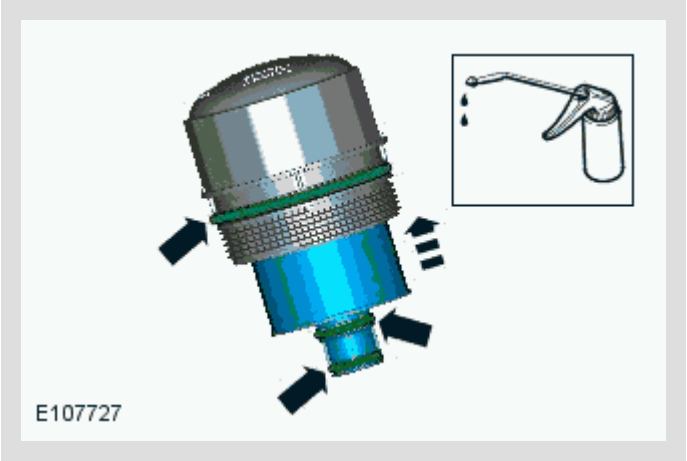
2. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

3.

NOTE:

Install new O-ring seals.

cardiagn.com

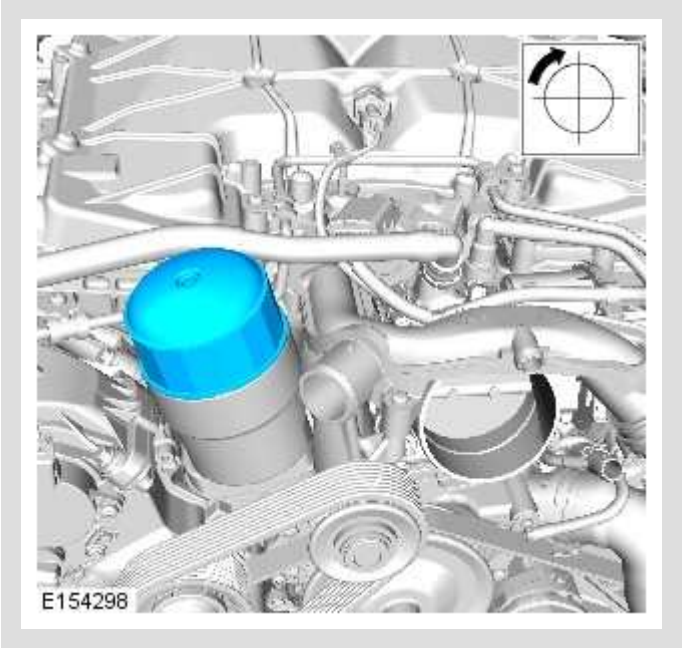


Lubricate the oil filter element O-ring seal with clean engine oil.

4.

CAUTION:

Tighten the component finger tight first.



Torque: **25 Nm**

5.

cardiagn.com

CAUTION:

Make sure that the vehicle is left for 5 minutes from filling with oil and that the engine oil level is reading at least minimum, before starting the engine. To check engine oil level follow steps 9-13.

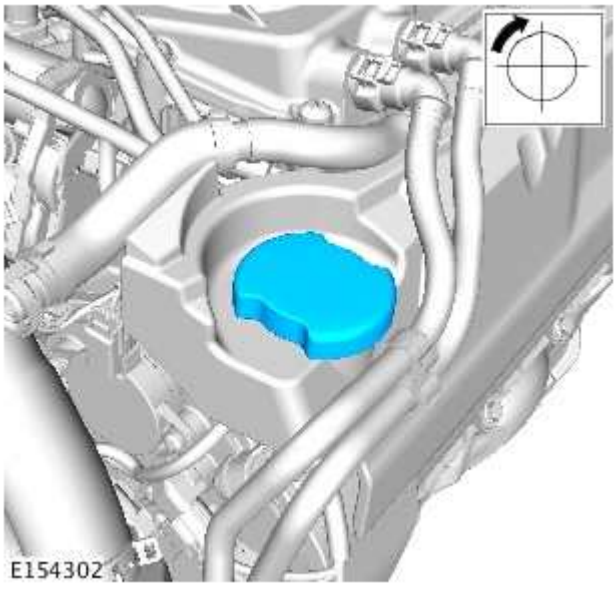
Fill the engine with oil.

Clean any residual engine oil from the oil filler cap area.
Refer to: Specifications (303-01A Engine - V6 S/C 3.0L Petrol, Specifications).
Refer to: Specifications (303-01B Engine - V8 S/C 5.0L Petrol, Specifications).

6.

CAUTION:

Correct installation of the oil filler cap can be obtained by tightening the cap until hard stop.



7.

cardiagn.com

CAUTION:

Make sure that the vehicle has been left for 5 minutes from filling with oil.

Follow the Steps 9-13 before starting the engine.

8.

Start the engine and allow to run for 10 minutes, stop the engine.

Check for leaks.

9.

CAUTIONS:

Make sure that the vehicle is parked on level ground.

Make sure that the selector lever and the gearshift mechanism are in the park (P) position.

Make sure that the hood is open.

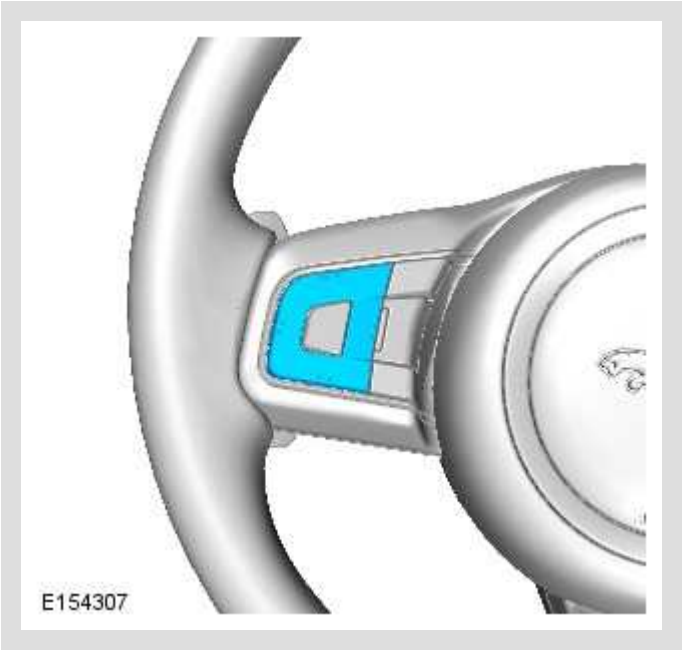
NOTE:

Allow 10 minutes from the engine switch off for the engine oil level to stabilize.

Turn the ignition on.

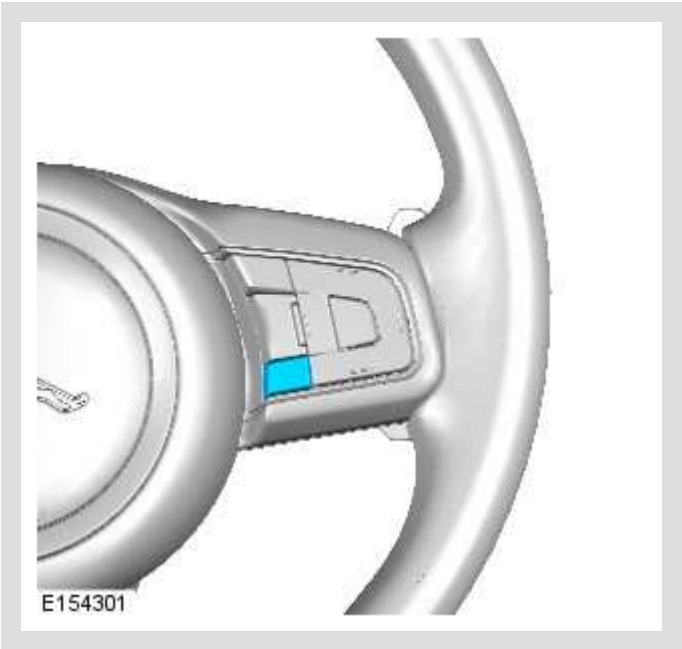
10.

cardiagn.com



Scroll through the message center to access the engine oil level display.

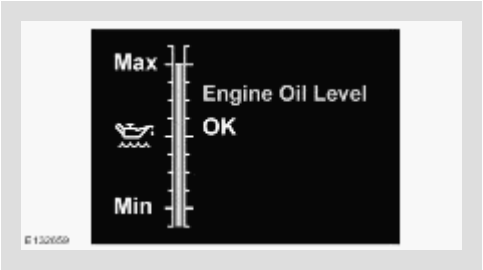
11.



Press the cruise control cancel button twice within 2 seconds.

12.

cardiagn.com



This display is now the live reading of the engine oil level.

Take a reading from the level display and, if necessary, top up with oil as instructed.

13. **NOTE:**

If instructed to follow Steps 9-13 in a previous step, return to Step 8 and continue the procedure.

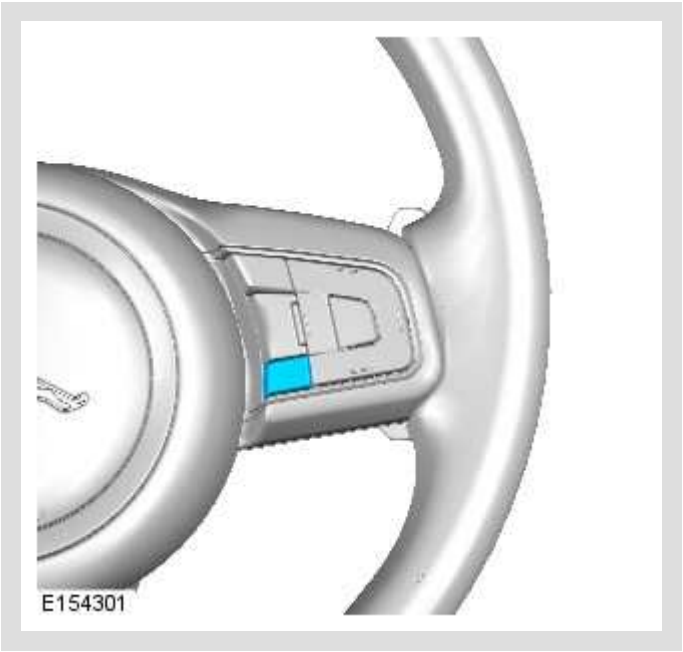
Turn the ignition off.

14. Allow 10 minutes for the engine oil level to stabilize if there has been additional oil top up.

15. **NOTE:**

The following steps are to update the average oil level value.

cardiagn.com



Turn the ignition on.

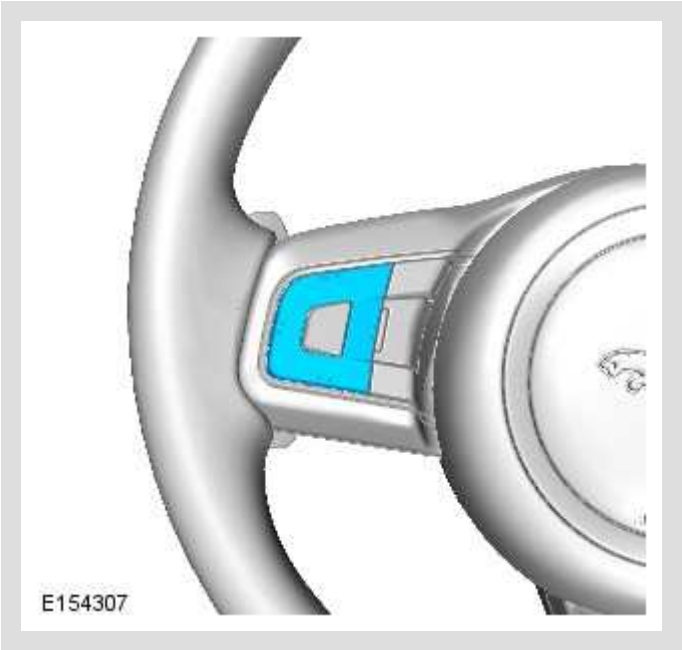
Press and hold the cruise control cancel button for more than 5 seconds.

16. Turn the ignition off.

17. Turn the ignition on.

18.

cardiagn.com



Scroll through the trip menu to access the engine oil level display.

Make sure that the average oil level value has now been updated.

19. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

cardiagn.com

SPECIFICATIONS

Engine Data

ENGINE DESCRIPTION	ENGINE CAPACITY	MAXIMUM ENGINE TORQUE (EEC) (SAE)	MAXIMUM ENGINE POWER (EEC) (SAE)	COMPRESSION RATIO	BORE	STROKE
• 90° "Vee" • 8 Cylinder • 32 Valves	4.999 ccm	625 Nm at 2.500 - 5.500 RPM	375 kW at 6.000 - 6.500 RPM	9.5 ± 0.50	92.509 ± 0.009 mm	93 ± 0.1 mm

Engine Firing Order

STANDARD	FIRING ORDER
ISO	1:2:7:3:4:5:6:8
DIN	1:5:4:2:6:3:7:8

Engine Valve Clearance (cold)

INTAKE VALVE	EXHAUST VALVE
0.20 ±0.02	0.25 ±0.02

Spark Plugs

SPECIFICATION	SPARK PLUG GAP
ILKR6C-10	1 mm

Lubricants, Fluids, Sealers and Adhesives

cardiagn.com

NOTE:

When servicing or draining the engine oil, the 0w20 oil is compatible with 5w20. Any residue mix is acceptable.

DESCRIPTION	SPECIFICATION
Engine Oil - Vehicles built up to 2015	SAE 5W20 WSS-M2C925-A **or** SAE 0W20 STJLR.51.5122
Engine Oil - Vehicles built from 2015	SAE 0W20 STJLR.51.5122
Sealant	WSE-M4G323-A6
Core plug and stub pipe retainer	WSK-M2G349-A7
Jaguar Premium Cooling System Fluid	WSS-M97B44-D

Capacities

NOTE:

For supercharged 5.0L engines.

DESCRIPTION	LITRES
Engine oil, initial fill	8.9
Engine oil, service fill with oil filter change	7.25
Engine oil, service fill without oil filter change	6.75

Capacities

NOTE:

For naturally aspirated 5.0L engines.

cardiagn.com

DESCRIPTION	LITRES
Engine oil, initial fill	8.75
Engine oil, service fill with oil filter change	7.25
Engine oil, service fill without oil filter change	6.75

Cylinder Head and Valve Train

ITEM	SPECIFICATION
Cylinder head **maximum** permitted warp (flatness specification)	0.2 mm (0.008 in)
Valve guide inner diameter (mm)	5.51 ± 0.01
Intake valve effective length (mm) (tip to gauge line)	117.21 ± 0.1
Exhaust valve effective length (mm) (tip to gauge line)	94.39 ± 0.1
Valve stem to guide clearance intake diametrical (mm)	0.022 - 0.057
Valve stem to guide clearance exhaust diametrical (mm)	0.03 - 0.065
Valve head diameter intake (mm)	36 ± 0.1
Valve head diameter exhaust (mm)	30 ± 0.1
Intake valve face angle (degrees)	44.875 ± 0.125
Exhaust valve face angle (degrees)	44.875 ± 0.125
Valve stem diameter intake (mm)	5.4705 ± 0.0075
Valve stem diameter exhaust (mm)	5.4625 ± 0.0075
Valve spring free length (mm) - inlet	46.1
Valve spring free length (mm) - exhaust	46.1
Valve spring installed height (mm) - inlet	35.74
Valve spring installed height (mm) - exhaust	35.1
Camshaft lobe lift intake (mm)	10
Camshaft lobe lift exhaust (mm)	9.36
Camshaft journal to cylinder head bearing surface clearance diametrical (mm)	0.025 - 0.065
Camshaft journal diameter - all positions	26.965 ± 0.01

cardiagn.com

Bearing diameter - all positions	27.01 ± 0.01
Camshaft journal maximum run out limit (mm)	
Camshaft journals to end journals	0.03
Camshaft journals to adjacent journals	0.015
Camshaft journal maximum out of round (mm) - all journals	0.005

Torque Specification

NOTE:

A = Refer to procedure for correct torque sequence.

DESCRIPTION	NM	LB-FT	LB-IN
Engine cover mounting bolts	10	7	-
Accessory drive belt tensioner retaining bolt	40	30	-
Supercharger belt idler/tensioner bracket retaining bolts	25	18	-
Secondary drive belt idler retaining bolts	40	30	-
Power steering pump pulley retaining bolts	25	18	-
Power steering pump retaining bolts	25	18	-
Power steering pump bracket to engine retaining bolts	25	18	-
Generator retaining bolts	48	35	-
Starter motor retaining bolts	48	35	-
Air conditioning compressor retaining bolts	25	18	-
Engine mounting to engine mounting bracket retaining nuts	48	35	-
Engine mounting to subframe retaining nuts	63	46	-
Engine mounting bracket to engine retaining bolts	48	35	-
Crankshaft damper pulley retaining LH threaded bolt	200 + 270°	148 + 180°	-
Flexplate retaining bolts	45 +	33 +	-

cardiagn.com

	90°	90°	
Exhaust manifold heat shield retaining bolts	A	-	-
Exhaust manifold retaining bolts	A	-	-
Engine wiring harness bracket retaining bolts	10	7	-
Coolant outlet pipe	10	7	-
Intercooler retaining bolts	25	18	-
Intake manifold retaining bolts	25	18	-
Oil Cooler retaining bolts	13	10	-
Knock sensor (KS) retaining bolt	20	14	-
Ignition coil retaining bolts	8	-	71
Spark plugs	20	15	-
Fuel rail retaining bolts	A	-	-
High pressure fuel pipe retaining bolts	A	-	-
High pressure fuel pump retaining bolts	12	9	-
Oil filter housing assembly retaining bolts	12	9	-
Oil filter cap	28	21	-
Lifting eye bolts	25 + 90°	18 + 90°	-
Manifold absolute pressure and temperature (MAPT) sensor sensor retaining bolts	5	-	44
Coolant pump retaining bolts	12	9	-
Variable valve timing (VVT) oil control solenoid retaining bolts	10	7	-
Camshaft position (CMP) sensor retaining bolts	10	7	-
Camshaft cover retaining bolts	13	10	-
Front upper timing cover retaining bolts	12	9	-
Front lower timing cover retaining bolts	A	-	-
Engine rear cover retaining bolts	A	-	-
VVT to camshaft retaining bolts	32	24	-
Camshaft bearing caps retaining bolts	11	8	-

cardiagn.com

Primary timing chain fixed guide retaining bolts	12	9	-
Primary timing chain tensioner retaining bolts	12	9	-
Primary timing chain tensioner guide blade retaining bolts	25	18	-
Auxiliary chain tensioner guide retaining bolts	21	15	-
Auxiliary chain fixed guide retaining bolt	12	9	-
Oil pump sprocket retaining bolt	21	15	-
Cylinder head retaining bolts	A	-	-
Engine oil level (EOL) sensor retaining bolt	12	9	-
Oil pan to oil sump body retaining bolts	12	9	-
Oil sump body to engine retaining bolts	25	18	-
Oil pan drain plug	23	17	-
Oil transfer tube to Oil pan body retaining bolts	11	8	-
Oil pump to engine block retaining bolts	25	18	-
Pick-up pipe to oil pump retaining bolts	12	9	-
Windage tray retaining bolts	25	18	-
Piston cooling jet retaining bolts	12	9	-
Engine block coolant draining plug	50	37	-
Connecting Rod bolts			
Stage 1	10	7	-
Stage 2	50	37	-
Main bearing cap			
M10 bolt Stage 1	25	18	-
M10 bolt Stage 2	57 + 70°	42 + 70°	-
M8 bolt Stage 1	15	11	-
M8 bolt Stage 2	33 + 75°	24 + 75°	-

cardiagn.com

2015.0 F-TYPE (X152), 501-02

FRONT END BODY PANELS

AIR DEFLECTOR (G1580212)

REMOVAL AND INSTALLATION

76.11.41	ENGINE UNDERTRAY - RENEW	ALL DERIVATIVES	0.2	USED WITHINS	
76.11.41	ENGINE UNDERTRAY - RENEW	PROJECT 7	0.2	USED WITHINS	

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1.

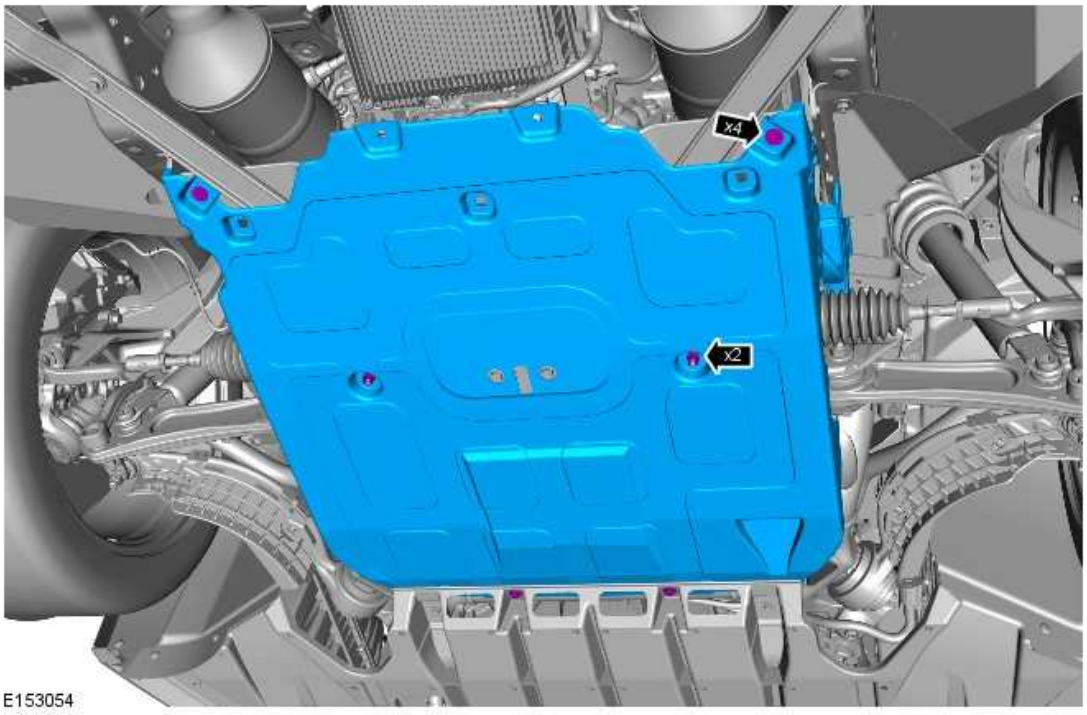
WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2.

cardiagn.com



Torque:

Nuts and rear bolts **4.1 Nm**

Front bolts **9 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

ENGINE COVER (G1580231)

REMOVAL AND INSTALLATION

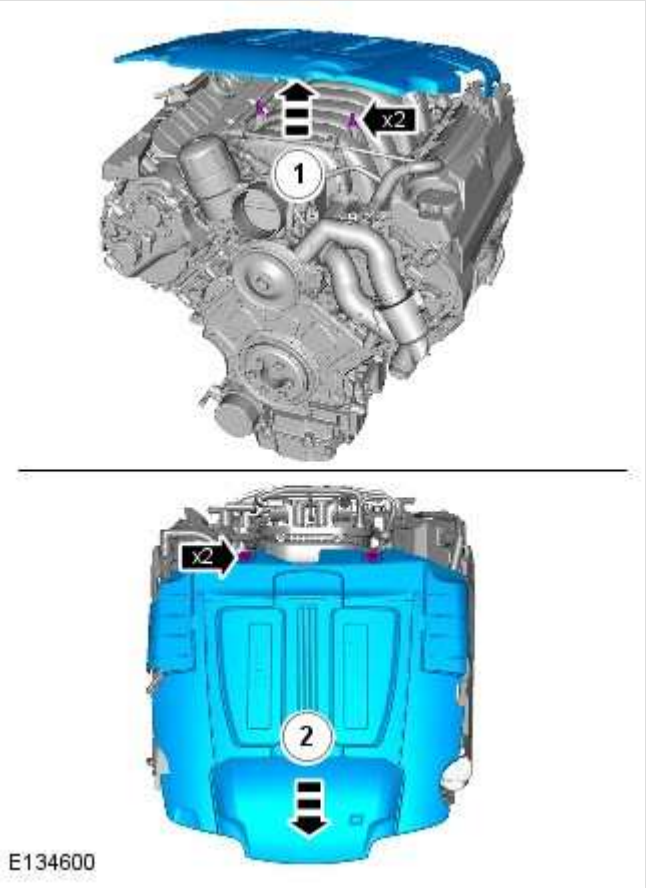
12.29.93	ENGINE COVER - RENEW	ALL DERIVATIVES	0.1	USED WITHINS	

REMOVAL

1.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.



cardiagn.com

INSTALLATION

1. To install, reverse the removal procedure.

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

SPECIFICATIONS

Engine Data

ENGINE DESCRIPTION	ENGINE CAPACITY	MAXIMUM ENGINE TORQUE (EEC) (SAE)	MAXIMUM ENGINE POWER (EEC) (SAE)	COMPRESSION RATIO	BORE	STROKE
• 90° "Vee" • 6 Cylinder • 24 Valves	2.995 ccm	450 Nm at 3.500 - 5.000 RPM	250 kW at 6.500 RPM	10.5 ± 0.50	84.5 ± 0.000 mm	89 ± 0.0 mm

Engine Firing Order

FIRING ORDER
1:4:2:5:3:6

Engine Valve Clearance (cold)

INTAKE VALVE (MM)	EXHAUST VALVE (MM)
0.18 - 0.22	0.23 - 0.27

cardiagn.com

Spark Plugs

SPECIFICATION	SPARK PLUG GAP
SILZKAR7C-10S	0.9 - 1.0 mm

Lubricants, Fluids, Sealers and Adhesives

NOTE:

When servicing or draining the engine oil, the 0w20 oil is compatible with 5w20. Any residue mix is acceptable.

DESCRIPTION	SPECIFICATION
Engine Oil - Vehicles built up to 2015	SAE 5W20 WSS-M2C925-A **or** SAE 0W20 STJLR.51.5122
Engine Oil - Vehicles built from 2015	SAE 0W20 STJLR.51.5122
Sealant	WSE-M4G323-A6
Core plug and stub pipe retainer	WSK-M2G349-A7
Jaguar Premium Cooling System Fluid	WSS-M97B44-D

Capacities

DESCRIPTION	LITRES
Engine oil, initial fill	8.75
Engine oil, service fill with oil filter change	7.25
Engine oil, service fill without oil filter change	6.75

Cylinder Head and Valve Train

ITEM	SPECIFICATION
Cylinder head **maximum** permitted warp (flatness specification)	0.2 mm (0.008 in)

cardiagn.com

Valve guide inner diameter (mm)	5.51 ± 0.01
Intake valve effective length (mm) (tip to gauge line)	117.58 ± 0.10
Exhaust valve effective length (mm) (tip to gauge line)	94.75 ± 0.10
Valve stem to guide clearance intake diametrical (mm)	0.042 - 0.057
Valve stem to guide clearance exhaust diametrical (mm)	0.060 - 0.075
Valve head diameter intake (mm)	31.6-Overall diameter-33 ± 0.10
Valve head diameter exhaust (mm)	26-Overall diameter-28 ± 0.10
Intake valve face angle (degrees)	44.875 ± 0.125
Exhaust valve face angle (degrees)	44° 52' 30" ± 7' 30"
Valve stem diameter intake (mm)	5.4705 ± 0.0075
Valve stem diameter exhaust (mm)	5.4525 ± 0.0075
Valve spring free length (mm) - inlet	46.1
Valve spring free length (mm) - exhaust	46.1
Valve spring installed height (mm) - inlet	36.78
Valve spring installed height (mm) - exhaust	37.07
Camshaft lobe lift intake (mm)	10
Camshaft lobe lift exhaust (mm)	9.36
Camshaft journal to cylinder head bearing surface clearance diametrical (mm)	0.025 - 0.065
Camshaft journal diameter - all positions	26.965 ± 0.01
Bearing diameter - all positions	27.01 ± 0.01
Camshaft journal maximum run out limit (mm)	
Camshaft journals to end journals	0.03
Camshaft journals to adjacent journals	0.015
Camshaft journal maximum out of round (mm) - all journals	0.005
Crankshaft end play (mm)	0.15 - 0.35

cardiagn.com

Crankshaft Pin and Bearing

NOTE:

Make sure that the crankshaft pin journal classification number is noted correctly, so that the correct bearing is installed.

CRANKSHAFT PIN DIAMETER BEARING SIZE (MM)	CRANKSHAFT PIN LETTER
55.982 - 55.988	A - G
55.989 - 55.994	H - N
55.995 - 56.000	P - W
Crankshaft Pin Letter	**Color**
A - G	Brown/Yellow (Part Number - DX23-6211-BFA)
H - N	Brown/Red (Part Number - DX23-6211-BEA)
P - W	Brown/Blue (Part Number - DX23-6211-BDA)

Torque Specification

NOTE:

A = Refer to procedure for correct torque sequence.

DESCRIPTION	NM	LB-FT	LB-IN
Engine cover mounting bolts	10	7	88
Accessory drive belt tensioner retaining bolt	40	30	354
Supercharger belt idler/tensioner bracket retaining bolts	25	18	221
Secondary drive belt idler retaining bolts	40	30	354

cardiagn.com

Power steering pump pulley retaining bolts	25	18	221
Power steering pump retaining bolts	25	18	221
Power steering pump bracket to engine retaining bolts	25	18	221
Generator retaining bolts	48	35	425
Starter motor retaining bolts	48	35	425
Air conditioning compressor retaining bolts	25	18	221
Engine mounting to engine mounting bracket retaining nuts	48	35	425
Engine mounting to subframe retaining nuts	63	46	558
Engine mounting bracket to engine retaining bolts	48	35	425
Crankshaft damper pulley retaining LH threaded bolt	200 + 270°	148 + 270°	1770 + 270°
Flexplate retaining bolts	45 + 90°	33 + 90°	398 + 90°
Exhaust manifold heat shield retaining bolts	A	-	-
Exhaust manifold retaining bolts	A	-	-
Engine wiring harness bracket retaining bolts	10	7	88
Coolant outlet pipe	10	7	88
Intercooler retaining bolts	25	18	221
Intake manifold retaining bolts	25	18	221
Oil Cooler retaining bolts	13	10	115
Knock sensor (KS) retaining bolt	20	14	177
Ignition coil retaining bolts	8	-	71
Spark plugs	20	15	177
Fuel rail retaining bolts	A	-	-
High pressure fuel pipe retaining bolts	A	-	-
High pressure fuel pump retaining bolts	12	9	106
Oil filter housing assembly retaining bolts	12	9	106
Oil filter cap	28	21	248
Lifting eye bolts	25 +	18 +	221 +

cardiagn.com

	90°	90°	90°
Manifold absolute pressure and temperature (MAPT) sensor sensor retaining bolts	5	-	44
Coolant pump retaining bolts	12	9	106
Variable valve timing (VVT) oil control solenoid retaining bolts	10	7	88
Camshaft position (CMP) sensor retaining bolts	10	7	88
Camshaft cover retaining bolts	13	10	115
Front upper timing cover retaining bolts	12	9	106
Front lower timing cover retaining bolts	A	-	-
Engine rear cover retaining bolts	A	-	-
VVT to camshaft retaining bolts	32	24	283
Camshaft bearing caps retaining bolts	11	8	97
Primary timing chain fixed guide retaining bolts	12	9	106
Primary timing chain tensioner retaining bolts	12	9	106
Primary timing chain tensioner guide blade retaining bolts	25	18	221
Auxiliary chain tensioner guide retaining bolts	21	15	186
Auxiliary chain fixed guide retaining bolt	12	9	106
Oil pump sprocket retaining bolt	25	18	221
Cylinder head retaining bolts	A	-	-
Engine oil level (EOL) sensor retaining bolt	12	9	106
Oil pan to oil sump body retaining bolts	12	9	106
Oil sump body to engine retaining bolts	25	18	221
Oil pan drain plug	24	17	212
Oil transfer tube to Oil pan body retaining bolts	11	8	97
Oil pump to engine block retaining bolts	25	18	221
Pick-up pipe to oil pump retaining bolts	12	9	106
Windage tray retaining bolts	25	18	221
Piston cooling jet retaining bolts	12	9	106

cardiagn.com

Engine block coolant draining plug	50	37	442
Balance shaft assembly retaining bolts	25 + 90°	18 + 90°	221 + 90°-
Rear balance weight assembly retaining nuts	25 + 38°	18 + 38°	221 + 38°
Rear balance weight assembly chain bracket retaining bolt	25	18	221
Connecting rod bolts	20 + 125°	14 + 125°	177 + 125°

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

ENGINE OIL VACUUM DRAINING AND FILLING

(G1586897)

GENERAL PROCEDURES

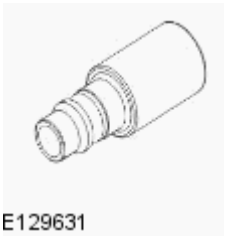
12.60.00.80	LUBRICATION SYSTEM DRAIN /REFILL - TOP-DOWN SERVICE STRATEGY **DO NOT ISSUE**	ALL DERIVATIVES	0.5	USED WITHINS	

SPECIAL TOOL(S)

303-1484

Vacuum Pump, Oil Drain

cardiagn.com

 E129631	**303-1484-01** Adapter for 303-1484

DRAINING

WARNING:

The spilling of hot engine oil is unavoidable during this procedure, care must be taken to prevent scalding.

NOTES:

- Clean the components general area prior to dismantling.
- Some variation in the illustrations may occur, but the essential information is always correct.

1.

cardiagn.com

CAUTION:

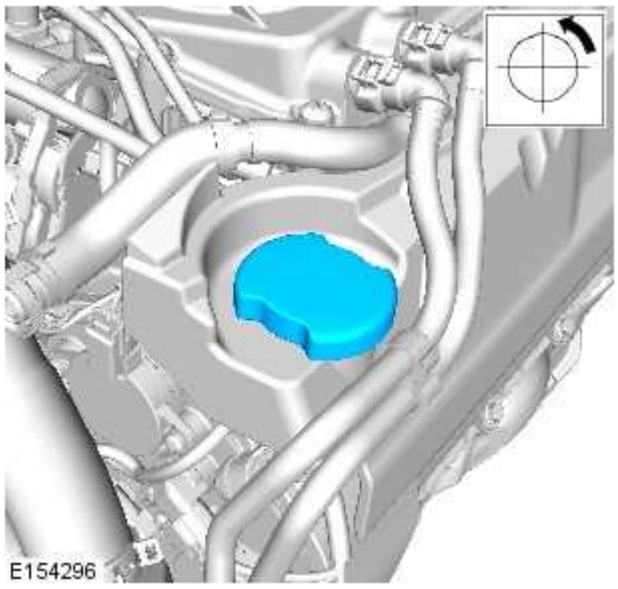
Make sure the engine is warm.

Start the engine and allow to run for 10 minutes, stop the engine.

2.

CAUTION:

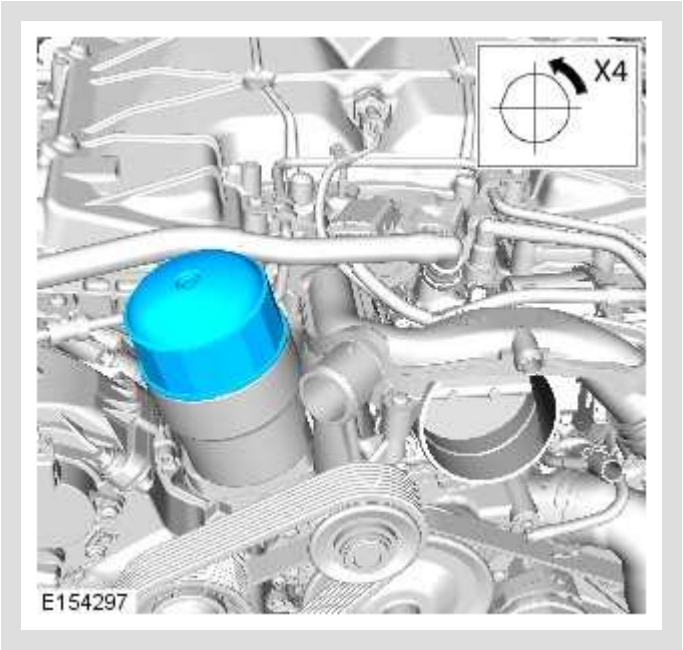
Allow 10 minutes from turning the engine off before starting oil extraction.



3. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

4.

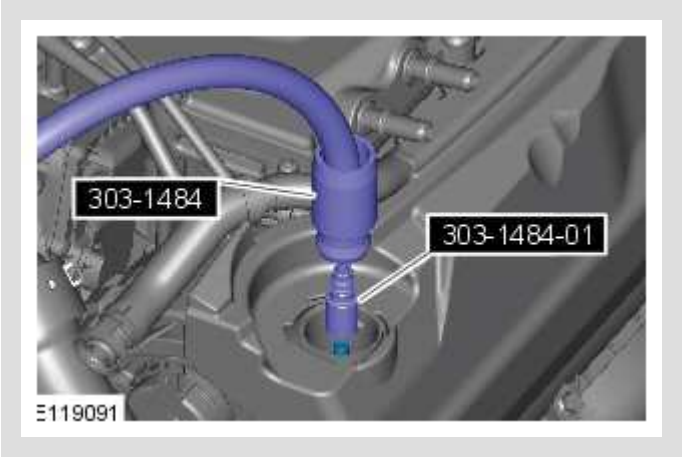
cardiagn.com



Loosen the element cover 4 complete turns to allow engine oil to drain from the filter cover.

1. Make sure that the O-ring seal is exposed.

5.



Using the oil vacuum pump drain the oil out through the oil extraction tube.

Special Tool(s): 303-1484 , 303-1484-01

cardiagn.com

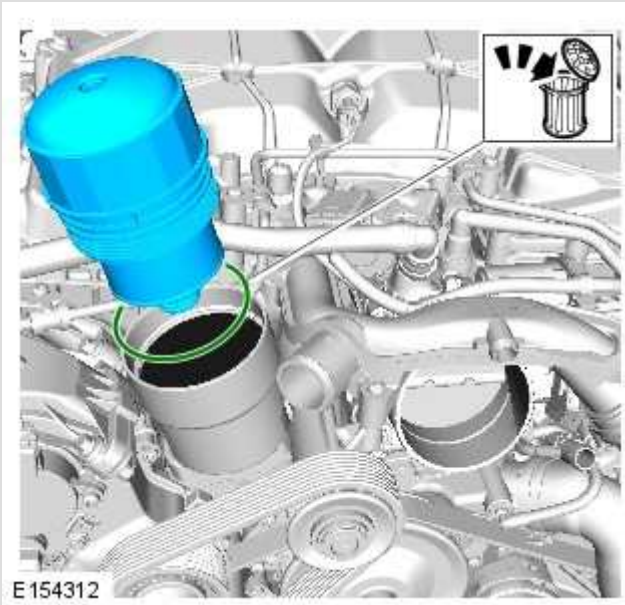
6.

Remove the oil vacuum pump.

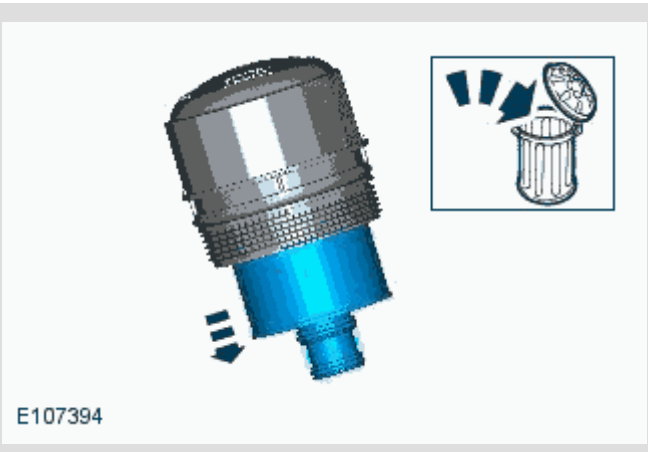
7.

NOTE:

Remove and discard the O-ring seal.



8.



Remove and discard the oil filter element.

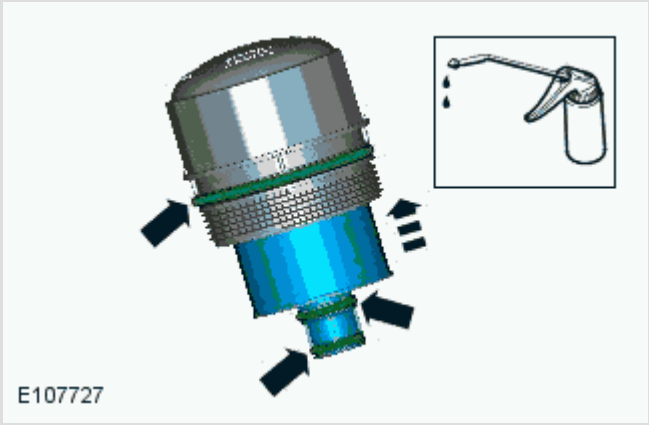
FILLING

1.

cardiagn.com

NOTE:

Install new O-ring seals.

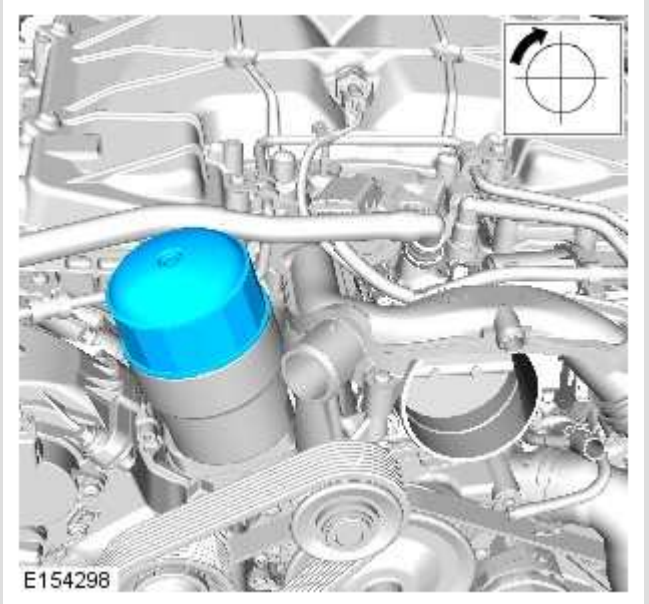


Lubricate the oil filter element O-ring seal with clean engine oil.

2.

CAUTION:

Tighten the component finger tight first.



Torque: **25 Nm**

3.

cardiagn.com

CAUTION:

Make sure that the vehicle is left for 5 minutes from filling with oil and that the engine oil level is reading at least minimum, before starting the engine. To check engine oil level follow steps 7-11.

Fill the engine with oil.

Clean any residual engine oil from the oil filler cap area.

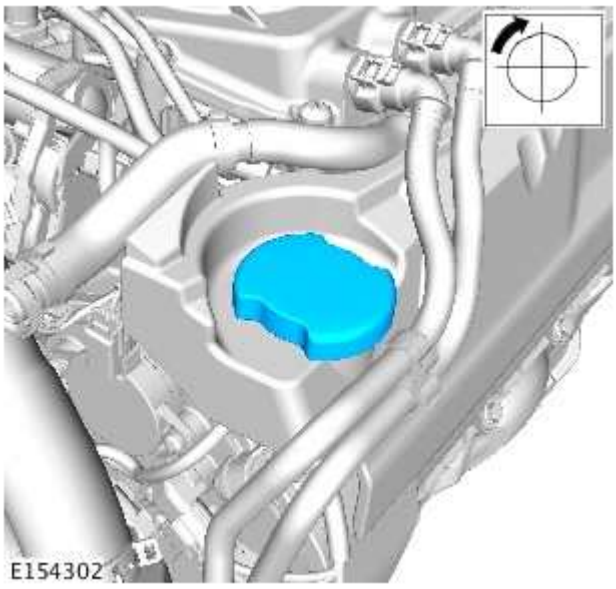
Refer to: Specifications (303-01A Engine - V6 S/C 3.0L Petrol, Specifications).

Refer to: Specifications (303-01B Engine - V8 S/C 5.0L Petrol, Specifications).

4.

CAUTION:

Correct installation of the oil filler cap can be obtained by tightening the cap until hard stop.



5.

cardiagn.com

CAUTION:

Make sure that the vehicle has been left for 5 minutes from filling with oil.

Follow the Steps 7-11 before starting the engine.

6.

Start the engine and allow to run for 10 minutes, stop the engine.

Check for leaks.

7.

CAUTIONS:

Make sure that the vehicle is parked on level ground.

Make sure that the selector lever and the gearshift mechanism are in the park (P) position.

Make sure that the hood is open.

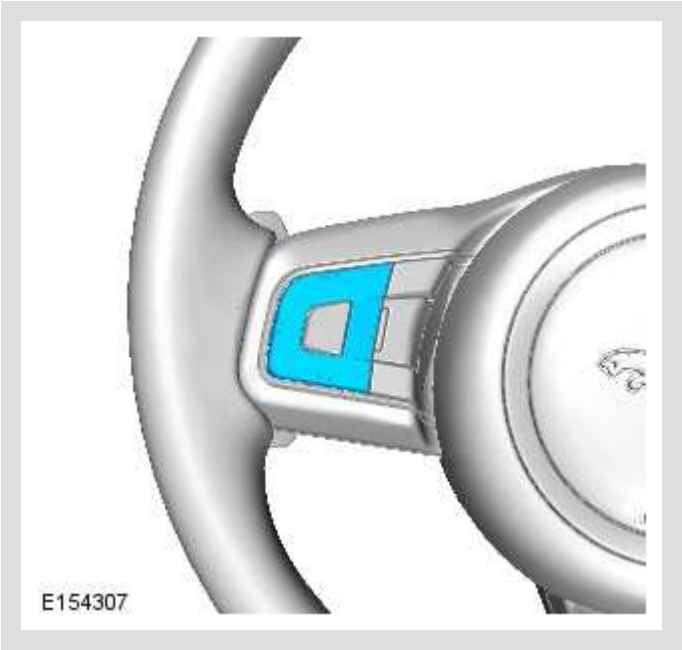
NOTE:

Allow 10 minutes from the engine switch off for the engine oil level to stabilize.

Turn the ignition on.

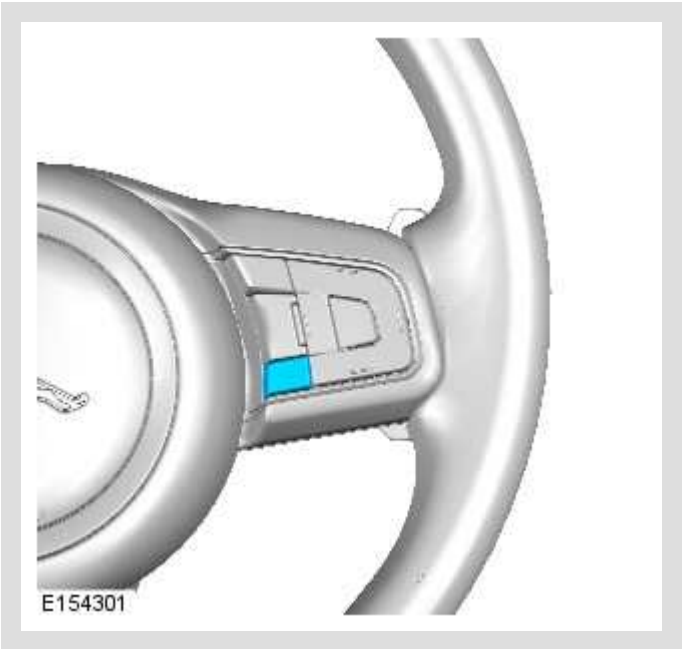
8.

cardiagn.com



Scroll through the message center to access the engine oil level display.

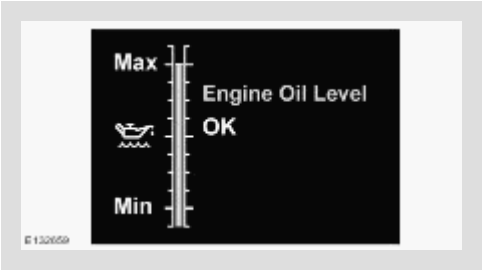
9.



Press the cruise control cancel button twice within 2 seconds.

10.

cardiagn.com



This display is now the live reading of the engine oil level.

Take a reading from the level display and, if necessary, top up with oil as instructed.

11.

NOTE:

If instructed to follow Steps 7-11 in a previous step, return to Step 6 and continue the procedure.

Turn the ignition off.

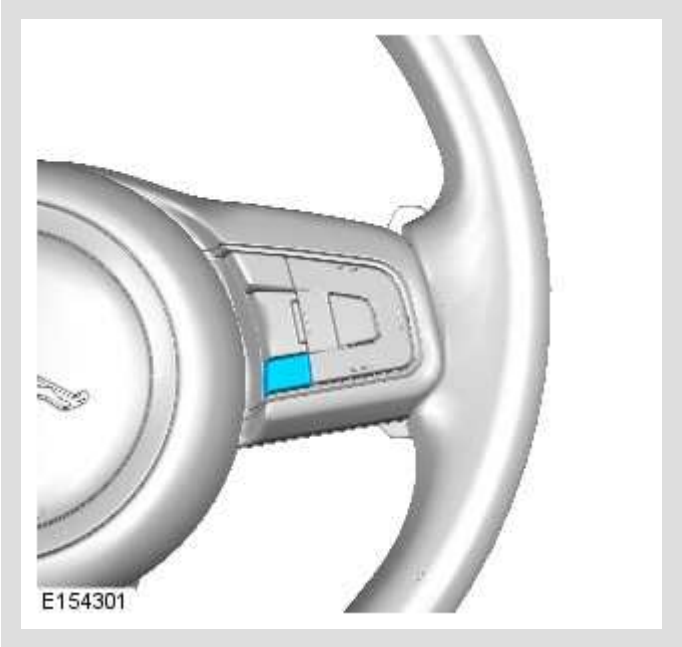
12. Allow 10 minutes for the engine oil level to stabilize if there has been additional oil top up.

13.

NOTE:

The following steps are to update the average oil level value.

cardiagn.com



Turn the ignition on.

Press and hold the cruise control cancel button for more than 5 seconds.

14.

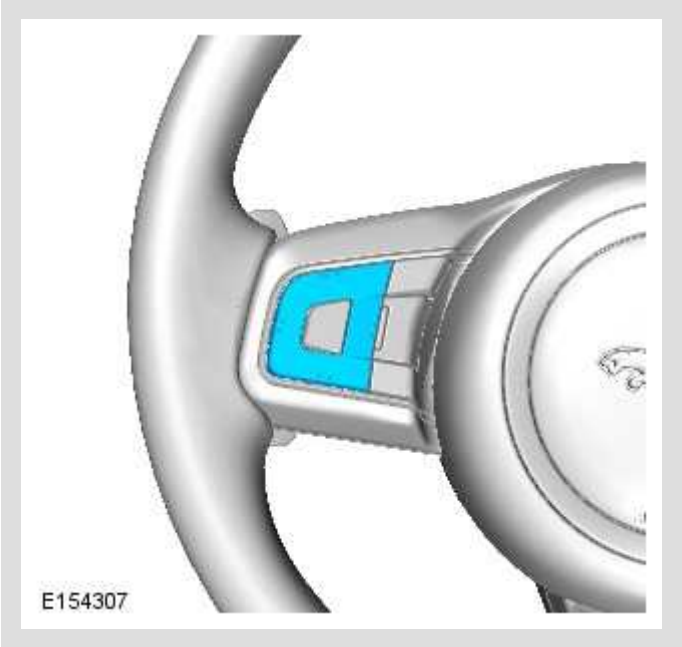
The message center display will revert to the normal display in the trip computer.

15. Turn the ignition off.

16. Turn the ignition on.

17.

cardiagn.com



Scroll through the trip menu to access the engine oil level display.

Make sure that the average oil level value has now been updated.

18. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V8 S/C 5.0L PETROL

SPECIFICATIONS

Engine Data

ENGINE DESCRIPTION	ENGINE CAPACITY	MAXIMUM ENGINE TORQUE (EEC) (SAE)	MAXIMUM ENGINE POWER (EEC) (SAE)	COMPRESSION RATIO	BORE	STROKE
• 90° "Vee" • 8 Cylinder • 32 Valves	4.999 ccm	625 Nm at 2.500 - 5.500 RPM	375 kW at 6.000 - 6.500 RPM	9.5 ± 0.50	92.509 ± 0.009 mm	93 ± 0.1 mm

Engine Firing Order

STANDARD	FIRING ORDER
ISO	1:2:7:3:4:5:6:8
DIN	1:5:4:2:6:3:7:8

Engine Valve Clearance (cold)

INTAKE VALVE	EXHAUST VALVE
0.20 ±0.02	0.25 ±0.02

Spark Plugs

SPECIFICATION	SPARK PLUG GAP
ILKR6C-10	1 mm

Lubricants, Fluids, Sealers and Adhesives

NOTE:

When servicing or draining the engine oil, the 0w20 oil is compatible with 5w20. Any residue mix is acceptable.

DESCRIPTION	SPECIFICATION
Engine Oil - Vehicles built up to 2015	SAE 5W20 WSS-M2C925-A **or** SAE 0W20 STJLR.51.5122

cardiagn.com

Engine Oil - Vehicles built from 2015	SAE 0W20 STJLR.51.5122
Sealant	WSE-M4G323-A6
Core plug and stub pipe retainer	WSK-M2G349-A7
Jaguar Premium Cooling System Fluid	WSS-M97B44-D

Capacities

NOTE:

For supercharged 5.0L engines.

DESCRIPTION	LITRES
Engine oil, initial fill	8.9
Engine oil, service fill with oil filter change	7.25
Engine oil, service fill without oil filter change	6.75

Capacities

NOTE:

For naturally aspirated 5.0L engines.

DESCRIPTION	LITRES
Engine oil, initial fill	8.75
Engine oil, service fill with oil filter change	7.25
Engine oil, service fill without oil filter change	6.75

Cylinder Head and Valve Train

ITEM	SPECIFICATION

cardiagn.com

Cylinder head **maximum** permitted warp (flatness specification)	0.2 mm (0.008 in)
Valve guide inner diameter (mm)	5.51 ± 0.01
Intake valve effective length (mm) (tip to gauge line)	117.21 ± 0.1
Exhaust valve effective length (mm) (tip to gauge line)	94.39 ± 0.1
Valve stem to guide clearance intake diametrical (mm)	0.022 - 0.057
Valve stem to guide clearance exhaust diametrical (mm)	0.03 - 0.065
Valve head diameter intake (mm)	36 ± 0.1
Valve head diameter exhaust (mm)	30 ± 0.1
Intake valve face angle (degrees)	44.875 ± 0.125
Exhaust valve face angle (degrees)	44.875 ± 0.125
Valve stem diameter intake (mm)	5.4705 ± 0.0075
Valve stem diameter exhaust (mm)	5.4625 ± 0.0075
Valve spring free length (mm) - inlet	46.1
Valve spring free length (mm) - exhaust	46.1
Valve spring installed height (mm) - inlet	35.74
Valve spring installed height (mm) - exhaust	35.1
Camshaft lobe lift intake (mm)	10
Camshaft lobe lift exhaust (mm)	9.36
Camshaft journal to cylinder head bearing surface clearance diametrical (mm)	0.025 - 0.065
Camshaft journal diameter - all positions	26.965 ± 0.01
Bearing diameter - all positions	27.01 ± 0.01
Camshaft journal maximum run out limit (mm)	
Camshaft journals to end journals	0.03
Camshaft journals to adjacent journals	0.015
Camshaft journal maximum out of round (mm) - all journals	0.005

Torque Specification

cardiagn.com

NOTE:

A = Refer to procedure for correct torque sequence.

DESCRIPTION	NM	LB-FT	LB-IN
Engine cover mounting bolts	10	7	-
Accessory drive belt tensioner retaining bolt	40	30	-
Supercharger belt idler/tensioner bracket retaining bolts	25	18	-
Secondary drive belt idler retaining bolts	40	30	-
Power steering pump pulley retaining bolts	25	18	-
Power steering pump retaining bolts	25	18	-
Power steering pump bracket to engine retaining bolts	25	18	-
Generator retaining bolts	48	35	-
Starter motor retaining bolts	48	35	-
Air conditioning compressor retaining bolts	25	18	-
Engine mounting to engine mounting bracket retaining nuts	48	35	-
Engine mounting to subframe retaining nuts	63	46	-
Engine mounting bracket to engine retaining bolts	48	35	-
Crankshaft damper pulley retaining LH threaded bolt	200 + 270°	148 + 180°	-
Flexplate retaining bolts	45 + 90°	33 + 90°	-
Exhaust manifold heat shield retaining bolts	A	-	-
Exhaust manifold retaining bolts	A	-	-
Engine wiring harness bracket retaining bolts	10	7	-
Coolant outlet pipe	10	7	-
Intercooler retaining bolts	25	18	-
Intake manifold retaining bolts	25	18	-
Oil Cooler retaining bolts	13	10	-

cardiagn.com

Knock sensor (KS) retaining bolt	20	14	-
Ignition coil retaining bolts	8	-	71
Spark plugs	20	15	-
Fuel rail retaining bolts	A	-	-
High pressure fuel pipe retaining bolts	A	-	-
High pressure fuel pump retaining bolts	12	9	-
Oil filter housing assembly retaining bolts	12	9	-
Oil filter cap	28	21	-
Lifting eye bolts	25 + 90°	18 + 90°	-
Manifold absolute pressure and temperature (MAPT) sensor sensor retaining bolts	5	-	44
Coolant pump retaining bolts	12	9	-
Variable valve timing (VVT) oil control solenoid retaining bolts	10	7	-
Camshaft position (CMP) sensor retaining bolts	10	7	-
Camshaft cover retaining bolts	13	10	-
Front upper timing cover retaining bolts	12	9	-
Front lower timing cover retaining bolts	A	-	-
Engine rear cover retaining bolts	A	-	-
VVT to camshaft retaining bolts	32	24	-
Camshaft bearing caps retaining bolts	11	8	-
Primary timing chain fixed guide retaining bolts	12	9	-
Primary timing chain tensioner retaining bolts	12	9	-
Primary timing chain tensioner guide blade retaining bolts	25	18	-
Auxiliary chain tensioner guide retaining bolts	21	15	-
Auxiliary chain fixed guide retaining bolt	12	9	-
Oil pump sprocket retaining bolt	21	15	-
Cylinder head retaining bolts	A	-	-

cardiagn.com

Engine oil level (EOL) sensor retaining bolt	12	9	-
Oil pan to oil sump body retaining bolts	12	9	-
Oil sump body to engine retaining bolts	25	18	-
Oil pan drain plug	23	17	-
Oil transfer tube to Oil pan body retaining bolts	11	8	-
Oil pump to engine block retaining bolts	25	18	-
Pick-up pipe to oil pump retaining bolts	12	9	-
Windage tray retaining bolts	25	18	-
Piston cooling jet retaining bolts	12	9	-
Engine block coolant draining plug	50	37	-
Connecting Rod bolts			
Stage 1	10	7	-
Stage 2	50	37	-
Main bearing cap			
M10 bolt Stage 1	25	18	-
M10 bolt Stage 2	57 + 70°	42 + 70°	-
M8 bolt Stage 1	15	11	-
M8 bolt Stage 2	33 + 75°	24 + 75°	-

cardiagn.com

ENGINE COVER (G1580231)

REMOVAL AND INSTALLATION

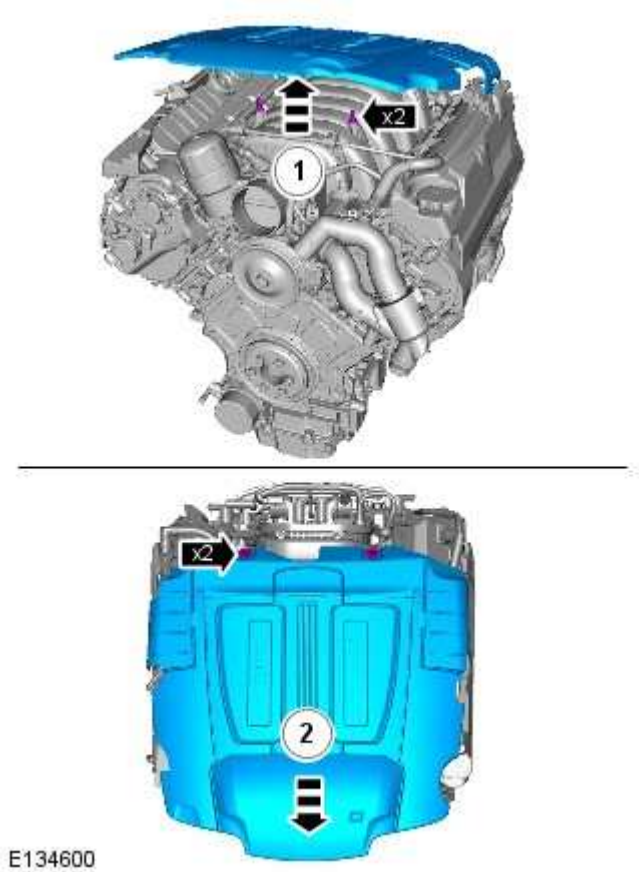
12.29.93	ENGINE COVER - RENEW	ALL DERIVATIVES	0.1	USED WITHINS

REMOVAL

1.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.



INSTALLATION

cardiagn.com

1. To install, reverse the removal procedure.

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

SPECIFICATIONS

Engine Data

ENGINE DESCRIPTION	ENGINE CAPACITY	MAXIMUM ENGINE TORQUE (EEC) (SAE)	MAXIMUM ENGINE POWER (EEC) (SAE)	COMPRESSION RATIO	BORE	STROKE
• 90° "Vee" • 6 Cylinder • 24 Valves	2.995 ccm	450 Nm at 3.500 - 5.000 RPM	250 kW at 6.500 RPM	10.5 ± 0.50	84.5 ± 0.000 mm	89 ± 0.0 mm

Engine Firing Order

FIRING ORDER
1:4:2:5:3:6

Engine Valve Clearance (cold)

INTAKE VALVE (MM)	EXHAUST VALVE (MM)
0.18 - 0.22	0.23 - 0.27

Spark Plugs

SPECIFICATION	SPARK PLUG GAP

cardiagn.com

SILZKAR7C-10S	0.9 - 1.0 mm

Lubricants, Fluids, Sealers and Adhesives

> **NOTE:**
>
> When servicing or draining the engine oil, the 0w20 oil is compatible with 5w20. Any residue mix is acceptable.

DESCRIPTION	SPECIFICATION
Engine Oil - Vehicles built up to 2015	SAE 5W20 WSS-M2C925-A **or** SAE 0W20 STJLR.51.5122
Engine Oil - Vehicles built from 2015	SAE 0W20 STJLR.51.5122
Sealant	WSE-M4G323-A6
Core plug and stub pipe retainer	WSK-M2G349-A7
Jaguar Premium Cooling System Fluid	WSS-M97B44-D

Capacities

DESCRIPTION	LITRES
Engine oil, initial fill	8.75
Engine oil, service fill with oil filter change	7.25
Engine oil, service fill without oil filter change	6.75

Cylinder Head and Valve Train

ITEM	SPECIFICATION
Cylinder head **maximum** permitted warp (flatness specification)	0.2 mm (0.008 in)
Valve guide inner diameter (mm)	5.51 ± 0.01
Intake valve effective length (mm) (tip to gauge line)	117.58 ± 0.10

cardiagn.com

Exhaust valve effective length (mm) (tip to gauge line)	94.75 ± 0.10
Valve stem to guide clearance intake diametrical (mm)	0.042 - 0.057
Valve stem to guide clearance exhaust diametrical (mm)	0.060 - 0.075
Valve head diameter intake (mm)	31.6-Overall diameter-33 ± 0.10
Valve head diameter exhaust (mm)	26-Overall diameter-28 ± 0.10
Intake valve face angle (degrees)	44.875 ± 0.125
Exhaust valve face angle (degrees)	44° 52' 30" ± 7' 30"
Valve stem diameter intake (mm)	5.4705 ± 0.0075
Valve stem diameter exhaust (mm)	5.4525 ± 0.0075
Valve spring free length (mm) - inlet	46.1
Valve spring free length (mm) - exhaust	46.1
Valve spring installed height (mm) - inlet	36.78
Valve spring installed height (mm) - exhaust	37.07
Camshaft lobe lift intake (mm)	10
Camshaft lobe lift exhaust (mm)	9.36
Camshaft journal to cylinder head bearing surface clearance diametrical (mm)	0.025 - 0.065
Camshaft journal diameter - all positions	26.965 ± 0.01
Bearing diameter - all positions	27.01 ± 0.01
Camshaft journal maximum run out limit (mm)	
Camshaft journals to end journals	0.03
Camshaft journals to adjacent journals	0.015
Camshaft journal maximum out of round (mm) - all journals	0.005
Crankshaft end play (mm)	0.15 - 0.35

Crankshaft Pin and Bearing

cardiagn.com

NOTE:

Make sure that the crankshaft pin journal classification number is noted correctly, so that the correct bearing is installed.

CRANKSHAFT PIN DIAMETER BEARING SIZE (MM)	CRANKSHAFT PIN LETTER
55.982 - 55.988	A - G
55.989 - 55.994	H - N
55.995 - 56.000	P - W
Crankshaft Pin Letter	**Color**
A - G	Brown/Yellow (Part Number - DX23-6211-BFA)
H - N	Brown/Red (Part Number - DX23-6211-BEA)
P - W	Brown/Blue (Part Number - DX23-6211-BDA)

Torque Specification

NOTE:

A = Refer to procedure for correct torque sequence.

DESCRIPTION	NM	LB-FT	LB-IN
Engine cover mounting bolts	10	7	88
Accessory drive belt tensioner retaining bolt	40	30	354
Supercharger belt idler/tensioner bracket retaining bolts	25	18	221
Secondary drive belt idler retaining bolts	40	30	354
Power steering pump pulley retaining bolts	25	18	221
Power steering pump retaining bolts	25	18	221

cardiagn.com

Power steering pump bracket to engine retaining bolts	25	18	221
Generator retaining bolts	48	35	425
Starter motor retaining bolts	48	35	425
Air conditioning compressor retaining bolts	25	18	221
Engine mounting to engine mounting bracket retaining nuts	48	35	425
Engine mounting to subframe retaining nuts	63	46	558
Engine mounting bracket to engine retaining bolts	48	35	425
Crankshaft damper pulley retaining LH threaded bolt	200 + 270°	148 + 270°	1770 + 270°
Flexplate retaining bolts	45 + 90°	33 + 90°	398 + 90°
Exhaust manifold heat shield retaining bolts	A	-	-
Exhaust manifold retaining bolts	A	-	-
Engine wiring harness bracket retaining bolts	10	7	88
Coolant outlet pipe	10	7	88
Intercooler retaining bolts	25	18	221
Intake manifold retaining bolts	25	18	221
Oil Cooler retaining bolts	13	10	115
Knock sensor (KS) retaining bolt	20	14	177
Ignition coil retaining bolts	8	-	71
Spark plugs	20	15	177
Fuel rail retaining bolts	A	-	-
High pressure fuel pipe retaining bolts	A	-	-
High pressure fuel pump retaining bolts	12	9	106
Oil filter housing assembly retaining bolts	12	9	106
Oil filter cap	28	21	248
Lifting eye bolts	25 + 90°	18 + 90°	221 + 90°
Manifold absolute pressure and temperature (MAPT)	5	-	44

cardiagn.com

sensor sensor retaining bolts			
Coolant pump retaining bolts	12	9	106
Variable valve timing (VVT) oil control solenoid retaining bolts	10	7	88
Camshaft position (CMP) sensor retaining bolts	10	7	88
Camshaft cover retaining bolts	13	10	115
Front upper timing cover retaining bolts	12	9	106
Front lower timing cover retaining bolts	A	-	-
Engine rear cover retaining bolts	A	-	-
VVT to camshaft retaining bolts	32	24	283
Camshaft bearing caps retaining bolts	11	8	97
Primary timing chain fixed guide retaining bolts	12	9	106
Primary timing chain tensioner retaining bolts	12	9	106
Primary timing chain tensioner guide blade retaining bolts	25	18	221
Auxiliary chain tensioner guide retaining bolts	21	15	186
Auxiliary chain fixed guide retaining bolt	12	9	106
Oil pump sprocket retaining bolt	25	18	221
Cylinder head retaining bolts	A	-	-
Engine oil level (EOL) sensor retaining bolt	12	9	106
Oil pan to oil sump body retaining bolts	12	9	106
Oil sump body to engine retaining bolts	25	18	221
Oil pan drain plug	24	17	212
Oil transfer tube to Oil pan body retaining bolts	11	8	97
Oil pump to engine block retaining bolts	25	18	221
Pick-up pipe to oil pump retaining bolts	12	9	106
Windage tray retaining bolts	25	18	221
Piston cooling jet retaining bolts	12	9	106
Engine block coolant draining plug	50	37	442
Balance shaft assembly retaining bolts	25 +	18 +	221 +

cardiagn.com

	90°	90°	90°-
Rear balance weight assembly retaining nuts	25 + 38°	18 + 38°	221 + 38°
Rear balance weight assembly chain bracket retaining bolt	25	18	221
Connecting rod bolts	20 + 125°	14 + 125°	177 + 125°

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

EXHAUST MANIFOLD LH (G1584109)

REMOVAL AND INSTALLATION

30.15.55	EXHAUST MANIFOLD LEFT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	2.7	USED WITHINS	

SPECIAL TOOL(S)

303-1444-01

Exhaust Manifold Installation Guide Pins - Threaded

cardiagn.com

303-1444-02

Exhaust Manifold Installation Guide Pins - Unthreaded

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2.

cardiagn.com

⚠ WARNING:

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

3. Refer to: Exhaust System (309-00A Exhaust System - V6 S/C 3.0L Petrol, Removal and Installation).

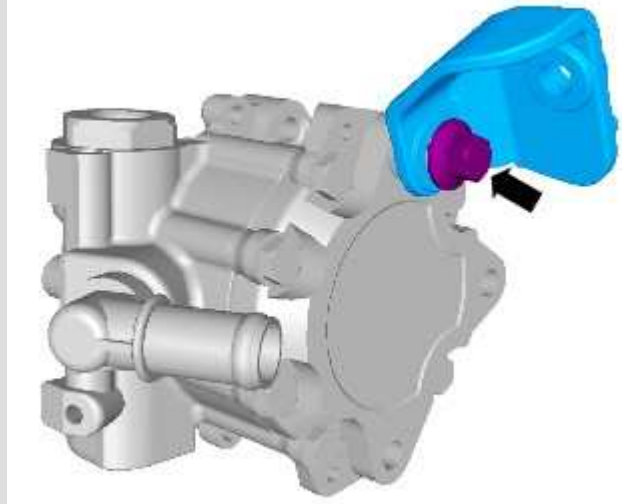
4. Refer to: Accessory Drive Belt (303-05B Accessory Drive - V8 S/C 5.0L Petrol, Removal and Installation).

5. Refer to: Engine Mount LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

6.

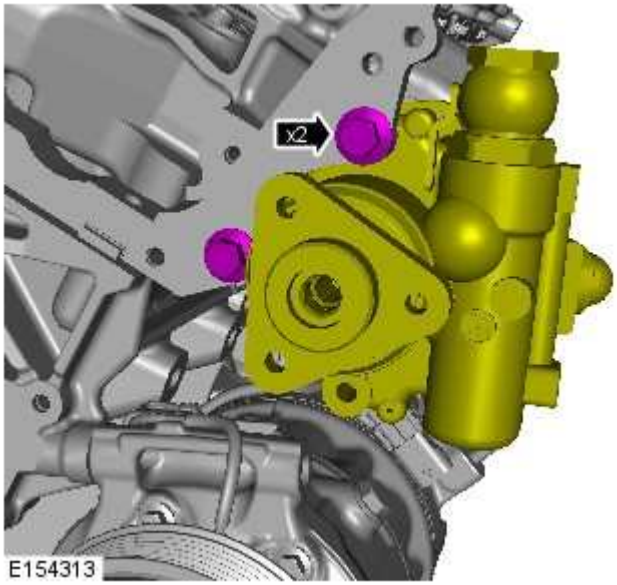
7.

cardiagn.com



E120280

8.



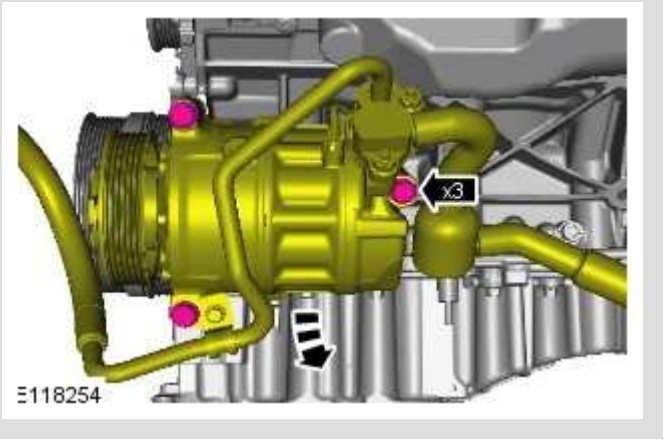
E154313

9.

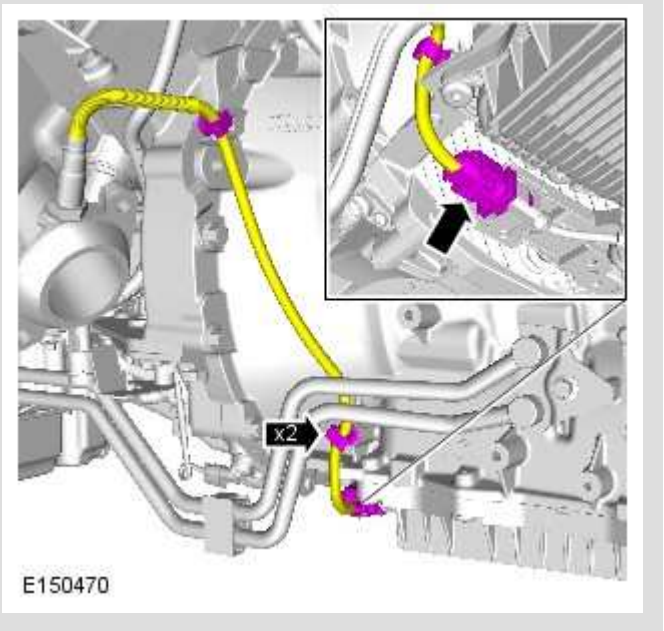
cardiagn.com

NOTE:

Loosen the bolts, but do not fully remove.

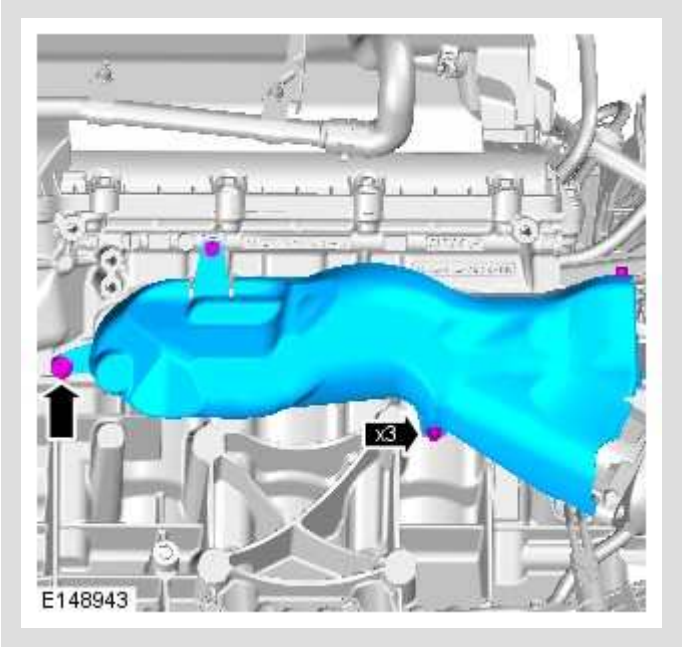


10.



11.

cardiagn.com



12.

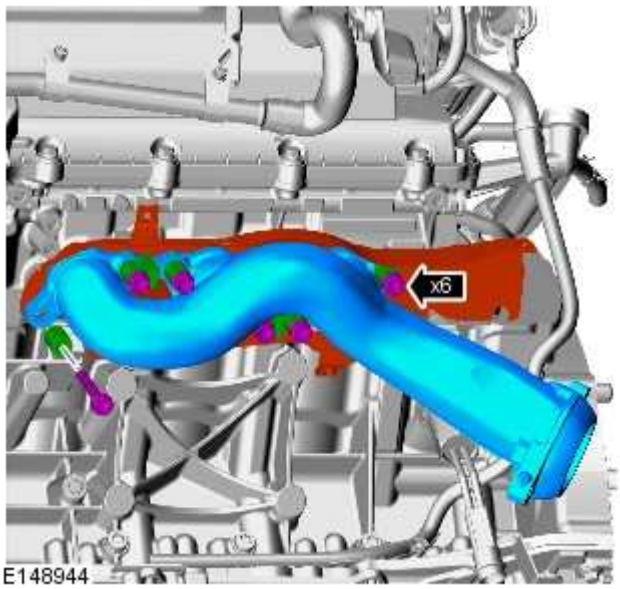
CAUTION:

Discard the bolts.

NOTES:

- Make sure that the position of the spacers is noted before removal of the manifold.
- Remove and discard the gasket.

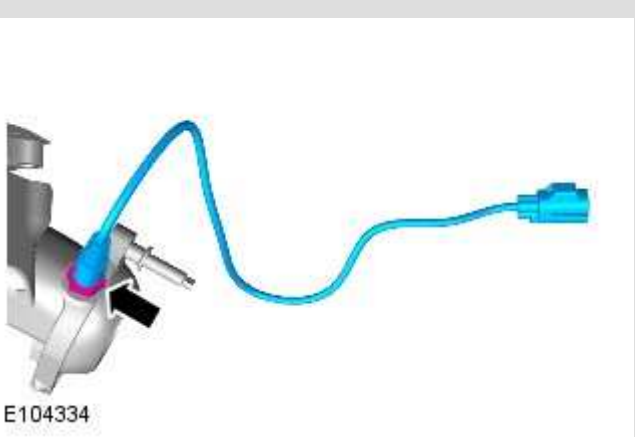
cardiagn.com



13.

NOTE:

Do not disassemble further if the component is removed for access only.



INSTALLATION

1.

cardiagn.com

CAUTIONS:

- Make sure that the mating faces are clean and free of foreign material.
- Make sure the anti-seize compound does not contact the HO2S tip.

NOTE:

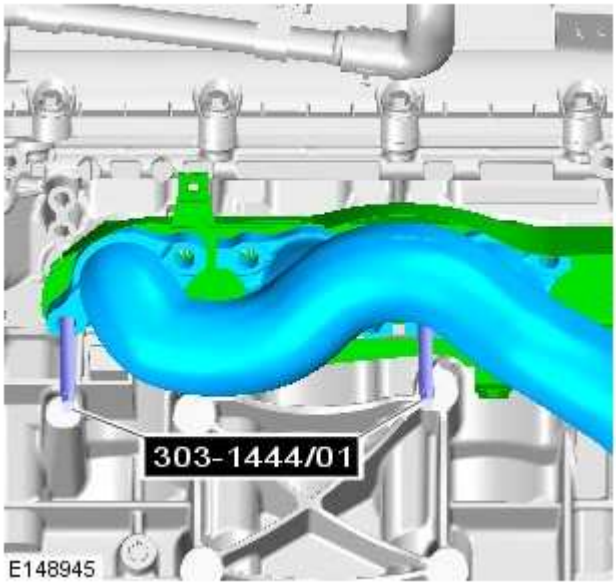
If the original sensor is to be installed, apply lubricant meeting specification ESE-M12A4-A to the thread of the sensor.

Torque: **45 Nm**

2.

NOTE:

Install a new gasket.



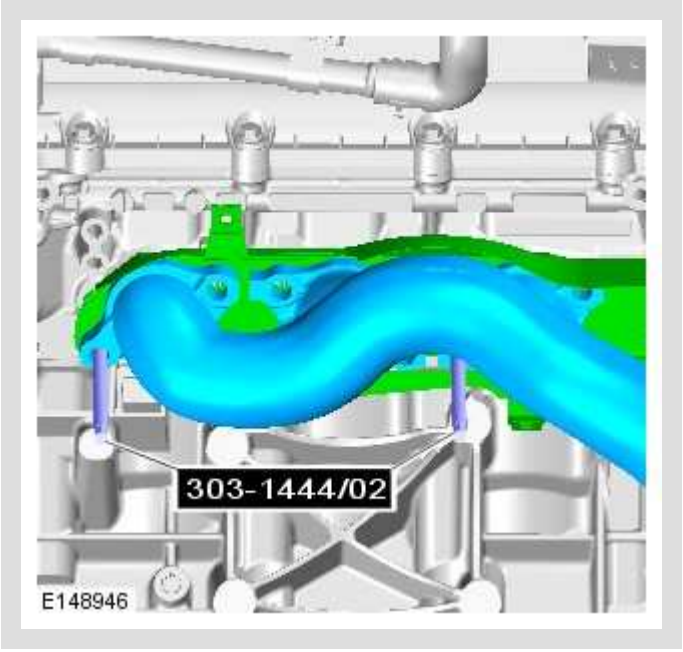
Special Tool(s): 303-1444-01

cardiagn.com

3.

NOTE:

If a new cylinder head is installed use the special tools in the illustration.



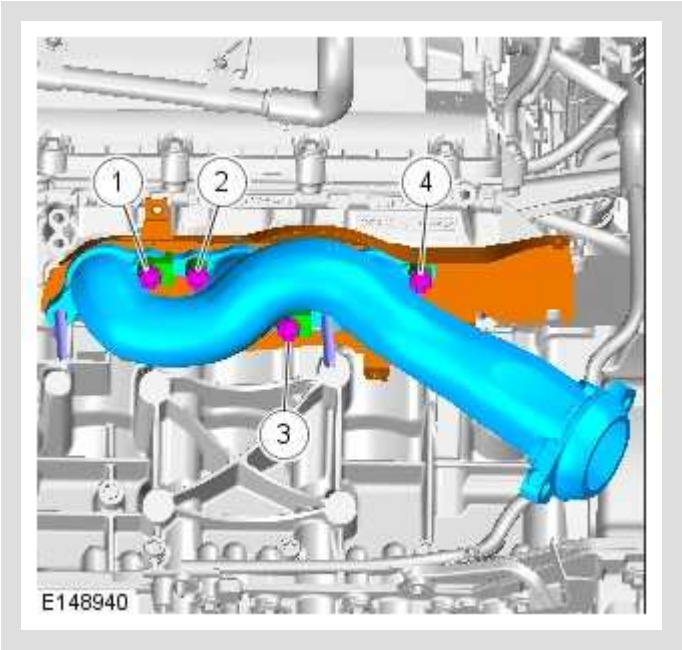
Special Tool(s): 303-1444-02

4.

NOTES:

- Make sure that new bolts are installed.
- Install the spacers in the noted position.

cardiagn.com



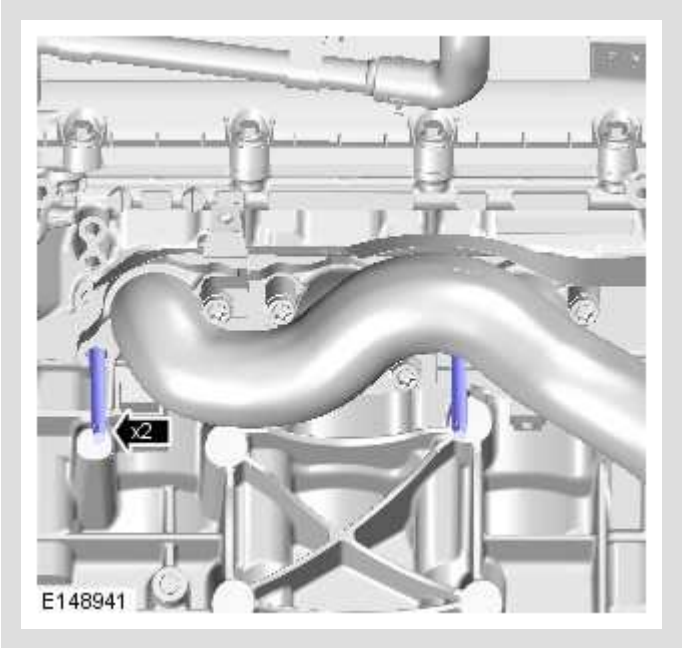
Torque: **10 Nm**

5.

NOTE:

Install the spacers in the noted position.

cardiagn.com



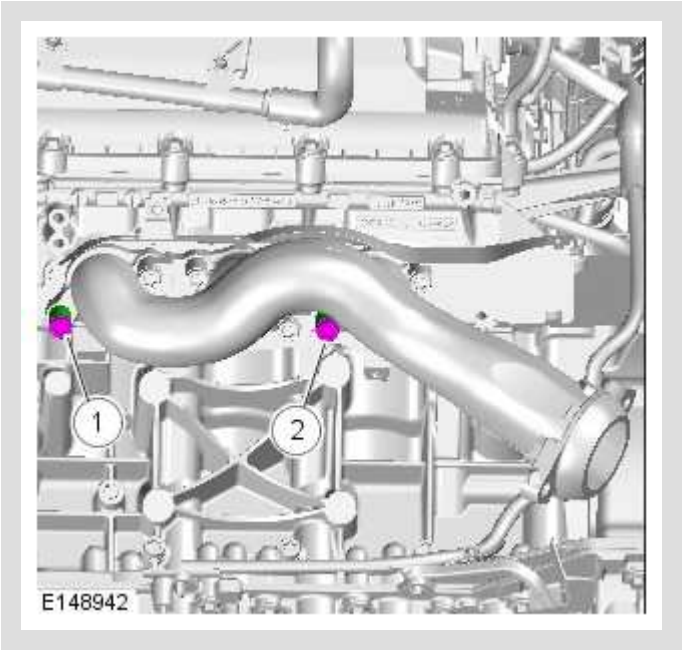
Remove the special tool.

6.

NOTES:

- Make sure that new bolts are installed.
- Install the spacers in the noted position.

cardiagn.com



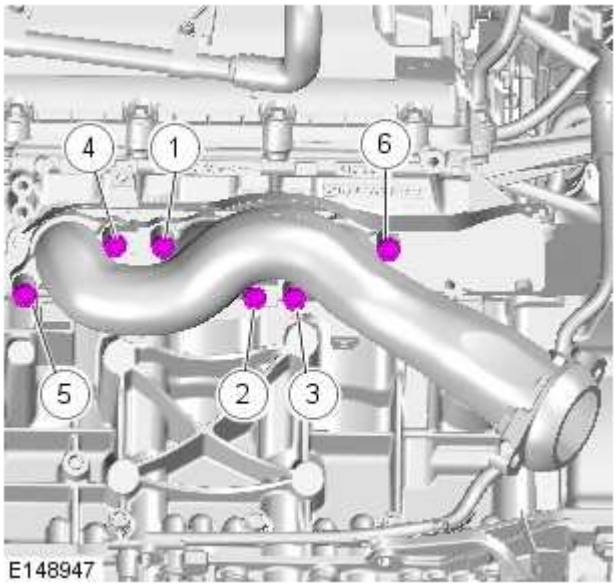
Torque: **10 Nm**

7.

CAUTION:

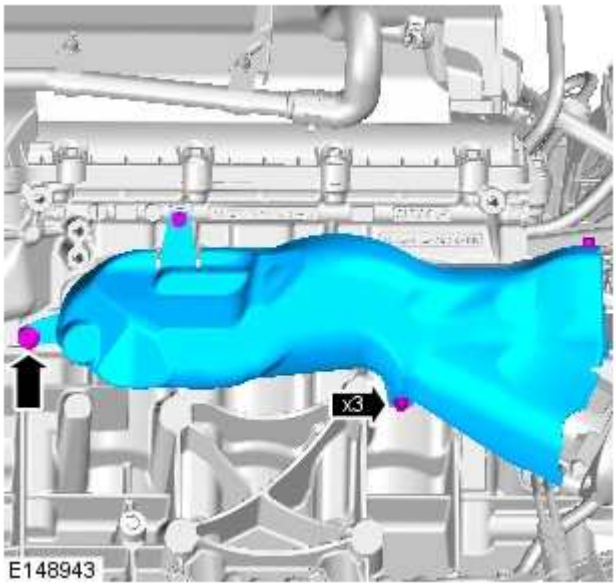
Tighten the bolts in the sequence shown.

cardiagn.com



Torque: **18 Nm**

8.



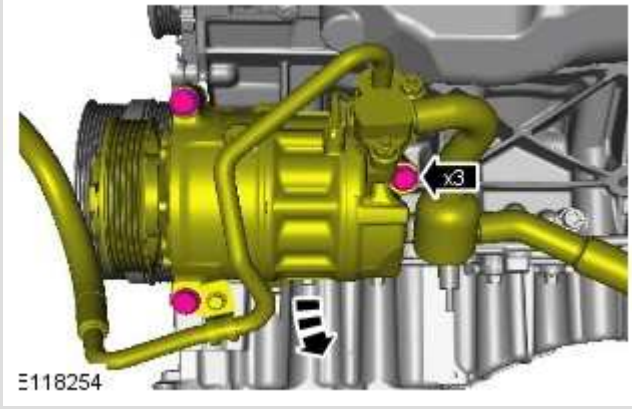
Torque:

Bolt 6.3 x 13 **3 Nm**

cardiagn.com

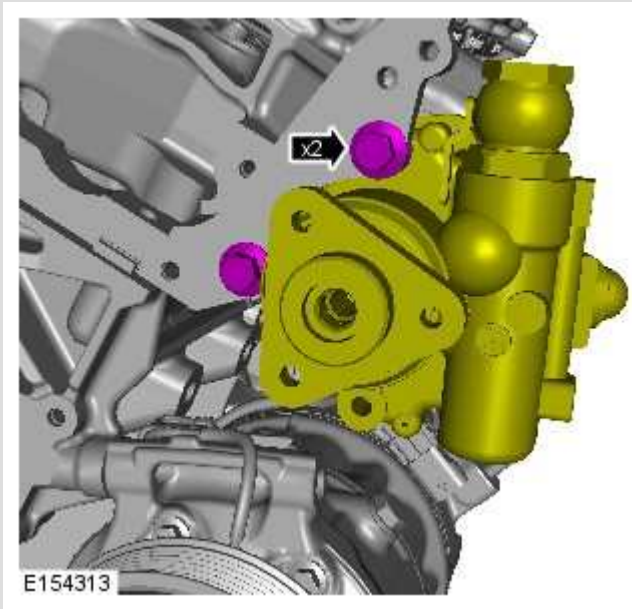
M8 **25 Nm**

9.



Torque: **25 Nm**

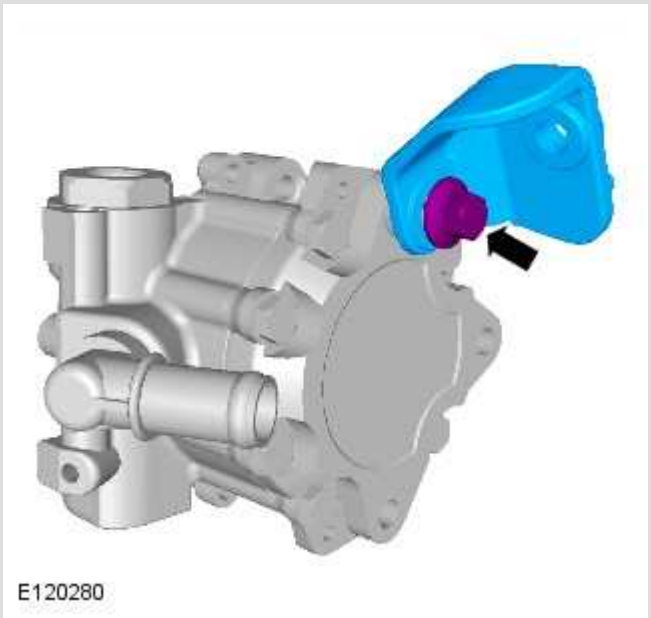
10.



Torque: **25 Nm**

11.

cardiagn.com



Torque: **25 Nm**

12.

cardiagn.com

Torque: **25 Nm**

13. Refer to: Engine Mount LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

14. Refer to: Accessory Drive Belt (303-05B Accessory Drive - V8 S/C 5.0L Petrol, Removal and Installation).

15. Refer to: Exhaust System (309-00A Exhaust System - V6 S/C 3.0L Petrol, Removal and Installation).

16. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

ACCESSORY DRIVE BELT (G1580332)

REMOVAL AND INSTALLATION

12.10.40	DRIVE BELT - FRONT END ACCESSORY DRIVE - RENEW	ALL DERIVATIVES	0.9	USED WITHINS	

REMOVAL

cardiagn.com

NOTES:

- Removal steps in this procedure may contain installation details.
- Engine shown removed for clarity.

All vehicles

1. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

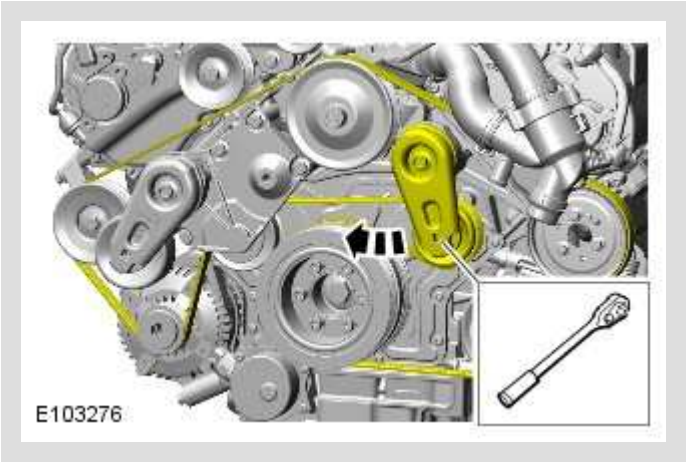
2. Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

Vehicles with hydraulic power steering

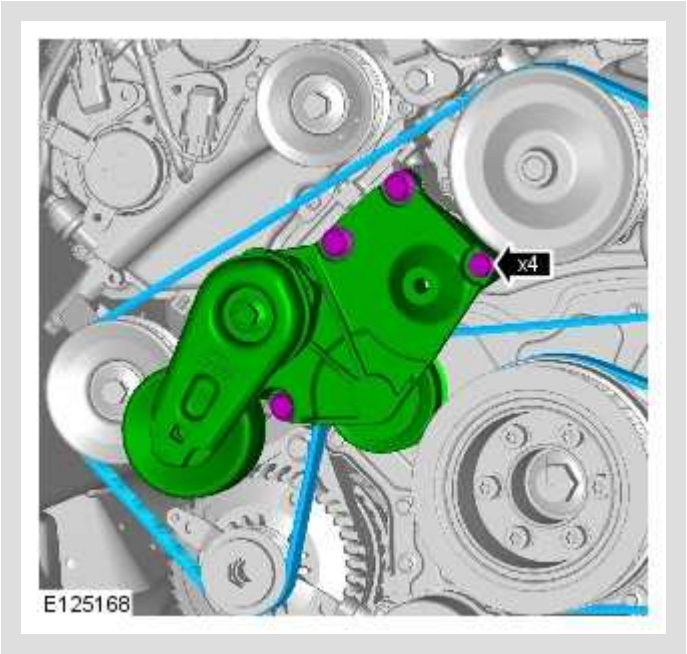
1. **NOTE:**

   Note the fitted position of the accessory drive belt.

cardiagn.com



2. Refer to: Supercharger Belt Idler Pulley (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Supercharger Belt Idler Pulley (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

3. 

Torque: **25 Nm**

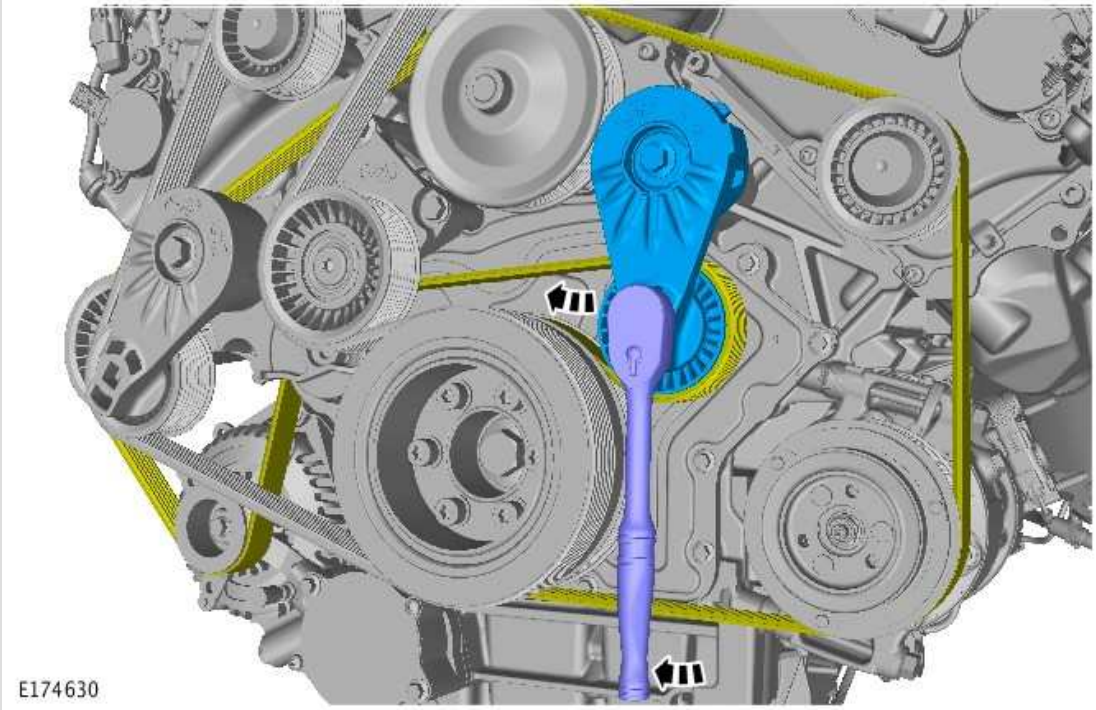
	Vehicles with electric power steering

cardiagn.com

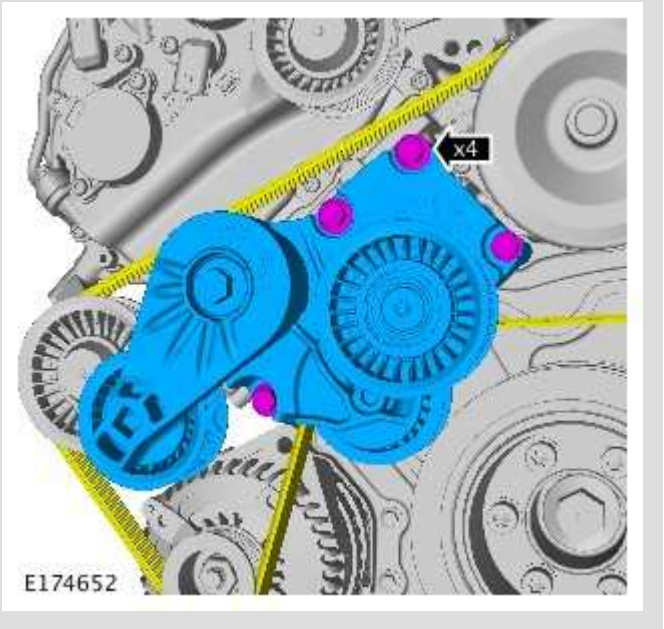
1.

NOTE:

Note the fitted position of the accessory drive belt.



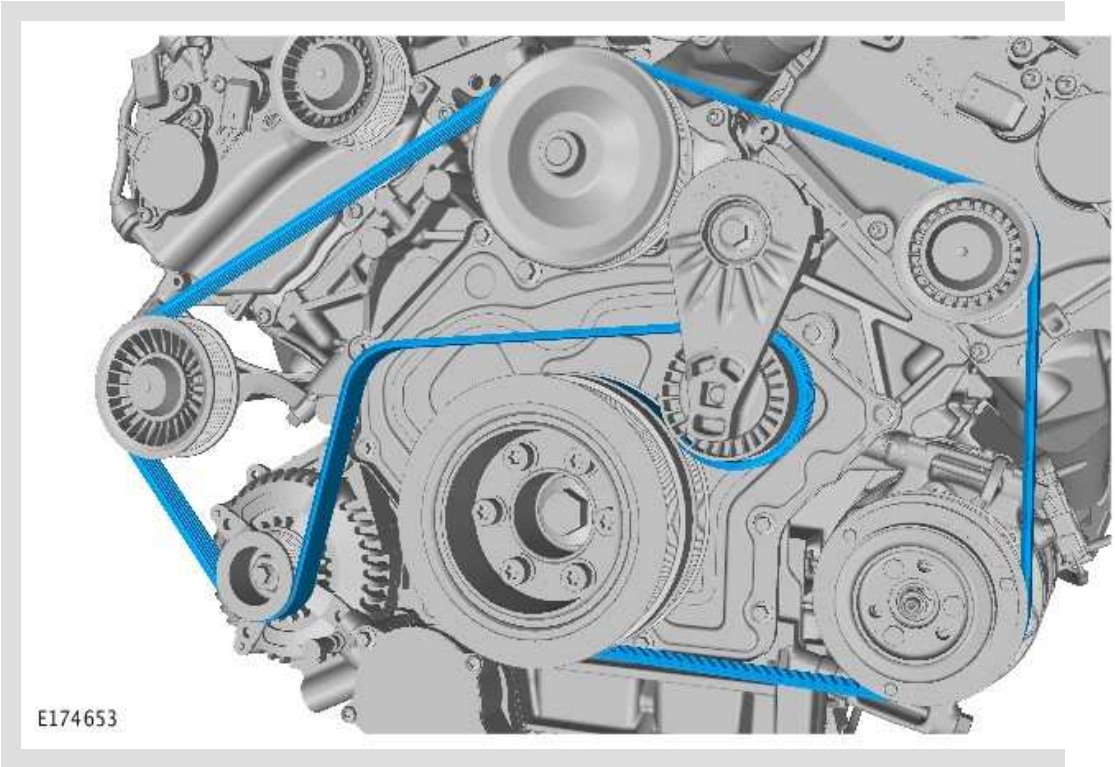
2.



Torque: **25 Nm**

3.

cardiagn.com



INSTALLATION

1.

CAUTION:

Make sure that the accessory drive belt is correctly located on each pulley.

To install, reverse the removal procedure.

cardiagn.com

ENGINE MOUNT LH (G1584107)

REMOVAL AND INSTALLATION

12.45.01	ENGINE MOUNTING - LEFT HAND - RENEW	RIGHT HAND DRIVE	0.7	USED WITHINS	

REMOVAL

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.

All vehicles

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

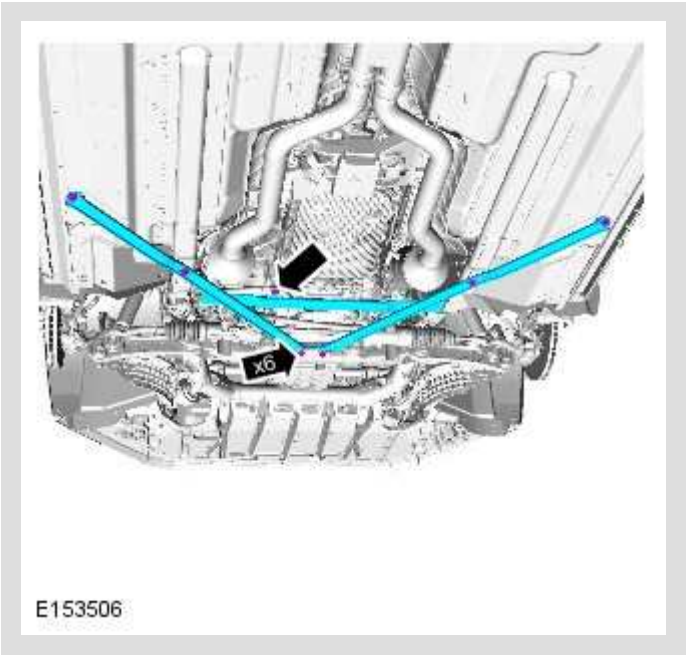
   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

3. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

cardiagn.com

4.



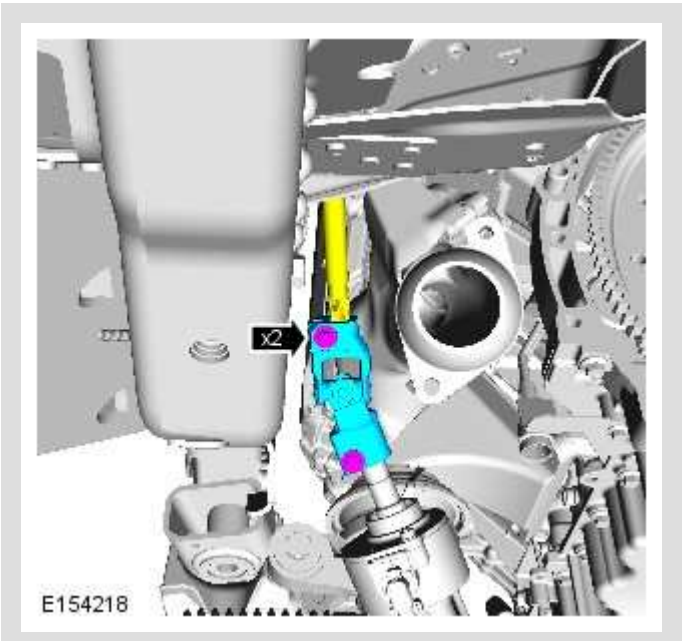
Torque: **55 Nm**

Left-hand drive vehicles

1.

CAUTIONS:

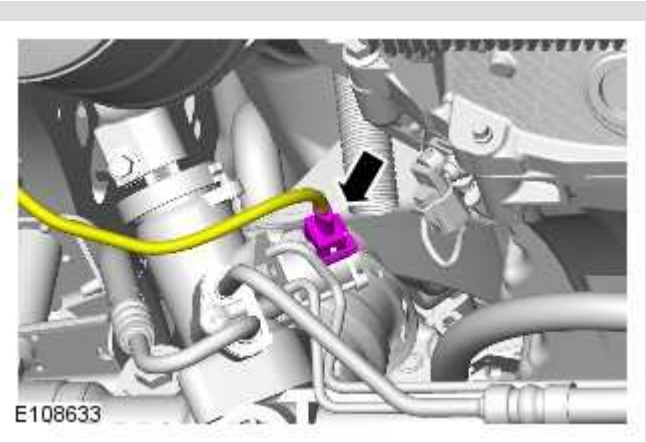
- Discard the bolts.
- Make sure that new bolts are installed.



cardiagn.com

Torque: **35 Nm**

2.



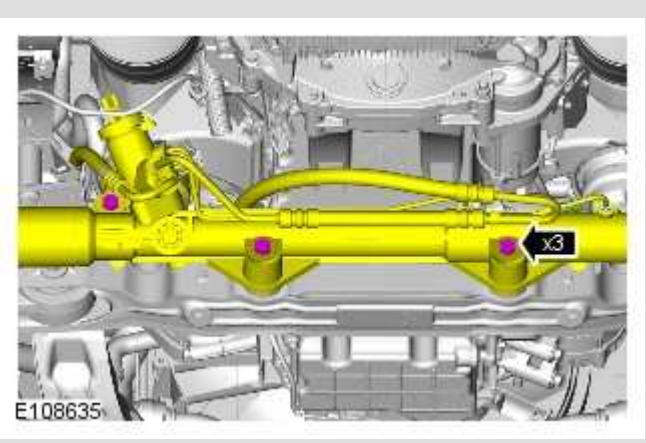
3.

CAUTION:

Make sure that the component is not suspended by the fluid hoses.

NOTE:

Make sure to support the steering gear.

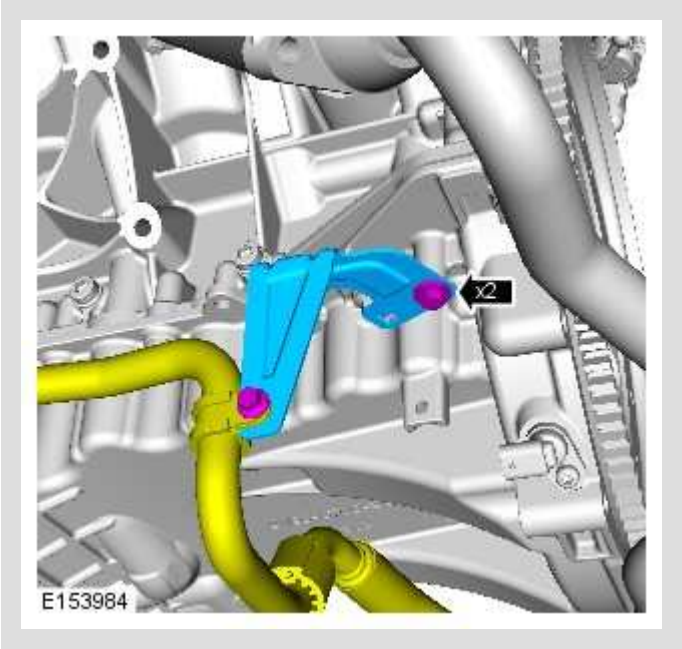


Torque: **100 Nm**

All vehicles

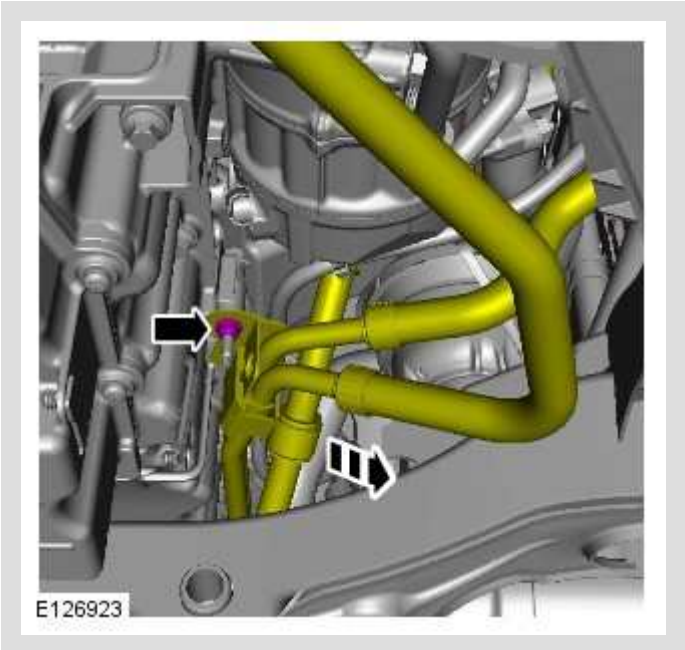
1.

cardiagn.com



Torque: **10 Nm**

2.



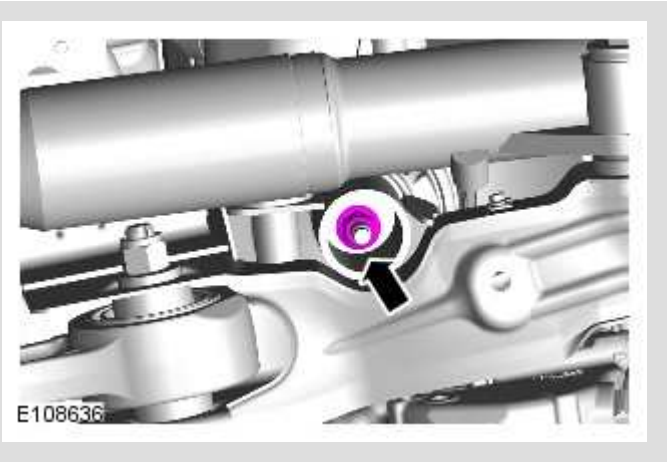
Torque: **10 Nm**

3.

NOTES:

- Remove and discard the nut.
- Make sure that a new nut is installed.

cardiagn.com



Torque: **63 Nm**

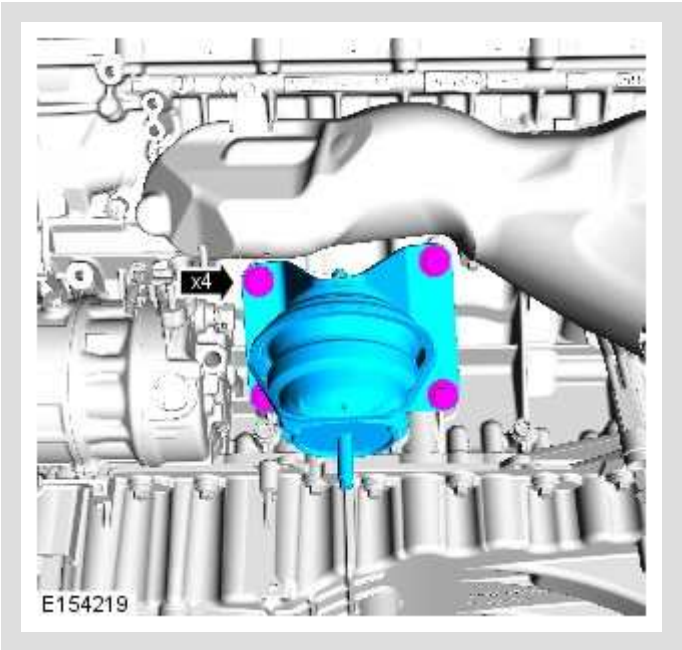
4.

CAUTIONS:

- Support the engine on a jack. The angle may need to be adjusted during this procedure.
- Use a wooden block to protect the oil pan when supporting the engine.

5.

cardiagn.com



Torque: **48 Nm**

6.

NOTE:

Do not disassemble further if the component is removed for access only.

cardiagn.com

NOTES:

Remove and discard the nut.

Make sure that a new nut is installed.

Torque: **48 Nm**

INSTALLATION

cardiagn.com

1. To install, reverse the removal procedure.

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

△ NOTES:

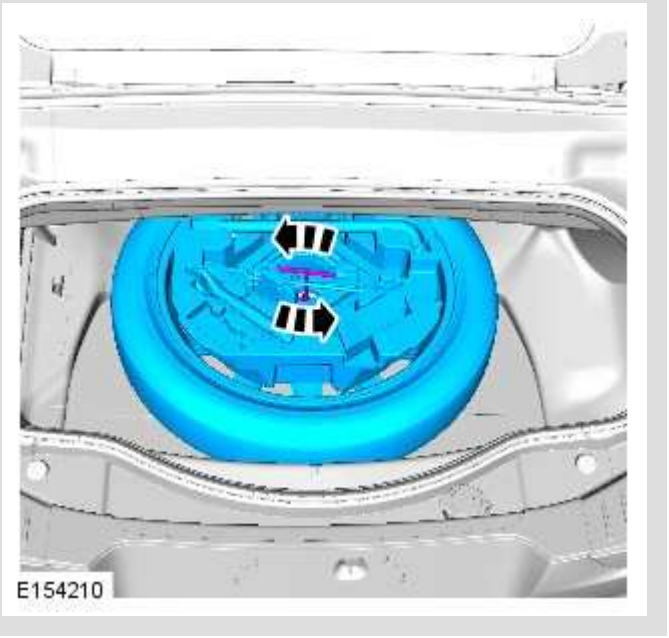
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

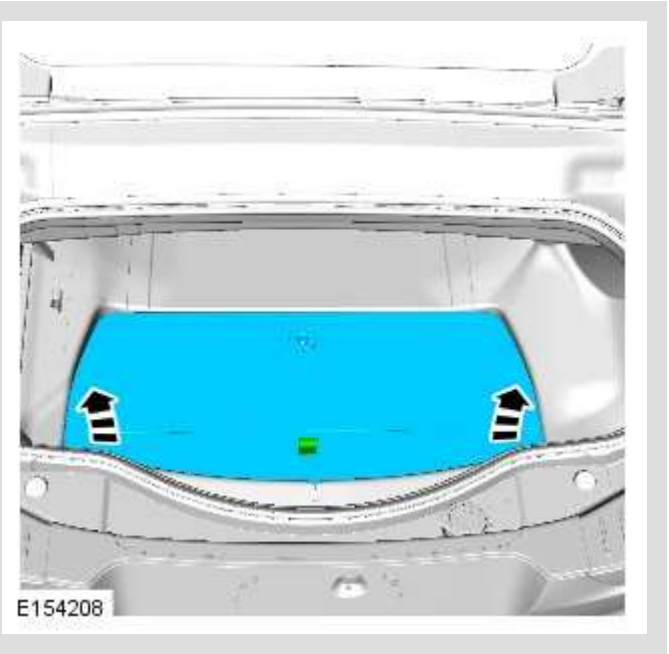
cardiagn.com

2. Obtain and record the audio unit preset radio frequencies.

3.

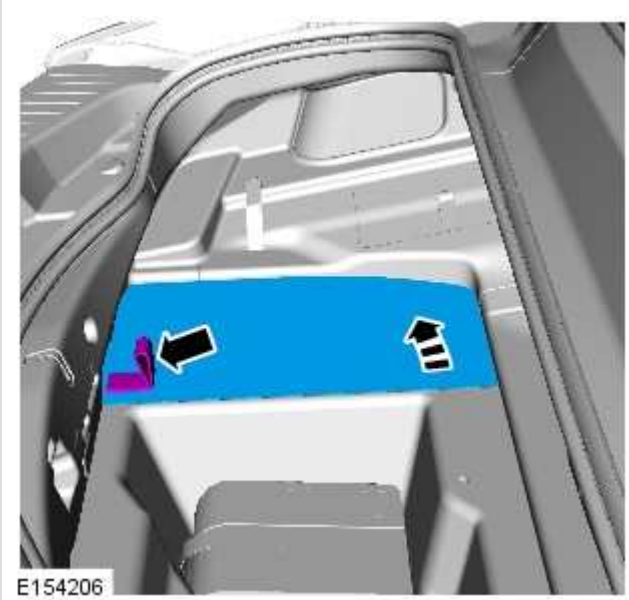


4.



5.

cardiagn.com

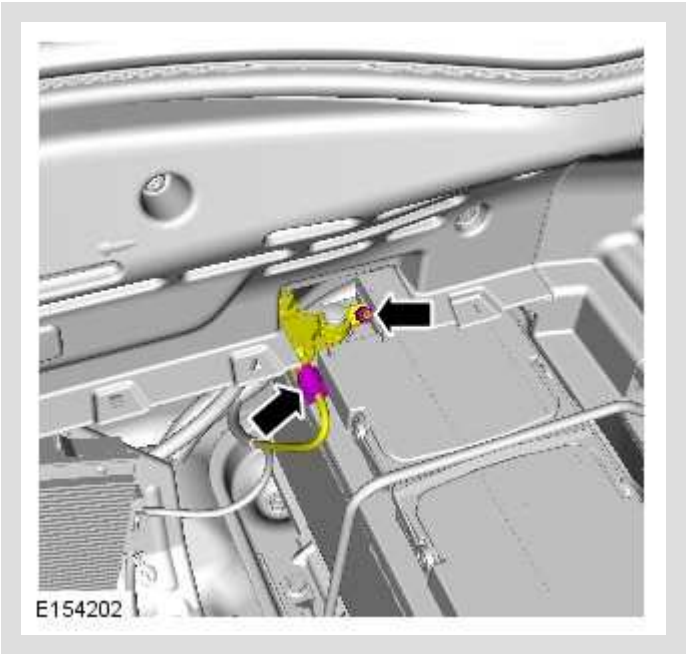


6.

CAUTION:

Take extra care not to damage the wiring harnesses.

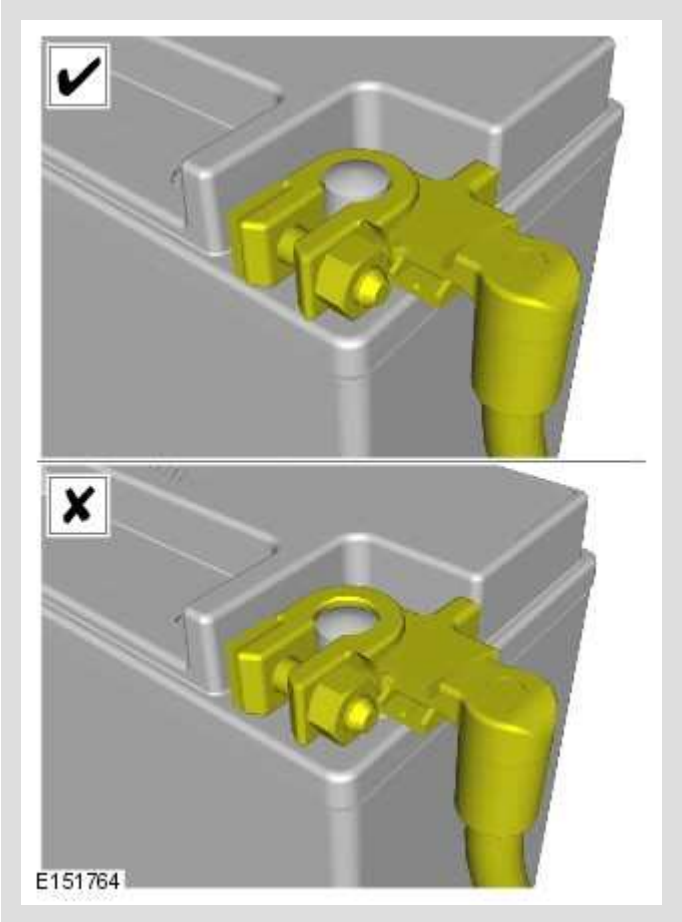
cardiagn.com



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9.

cardiagn.com

NOTE:

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

2015.0 F-TYPE (X152), 309-00

EXHAUST SYSTEM - V6 S/C 3.0L PETROL

EXHAUST SYSTEM (G1580322)

REMOVAL AND INSTALLATION

30.10.01	EXHAUST SYSTEM - RENEW	3000 CC, AJ V6 (AJ126)	0.8	USED WITHINS	
30.10.01	EXHAUST SYSTEM -	SVR	0.8	USED	

REMOVAL

WARNING:

Observe due care when working near a hot exhaust system.

NOTE:

Removal steps in this procedure may contain installation details.

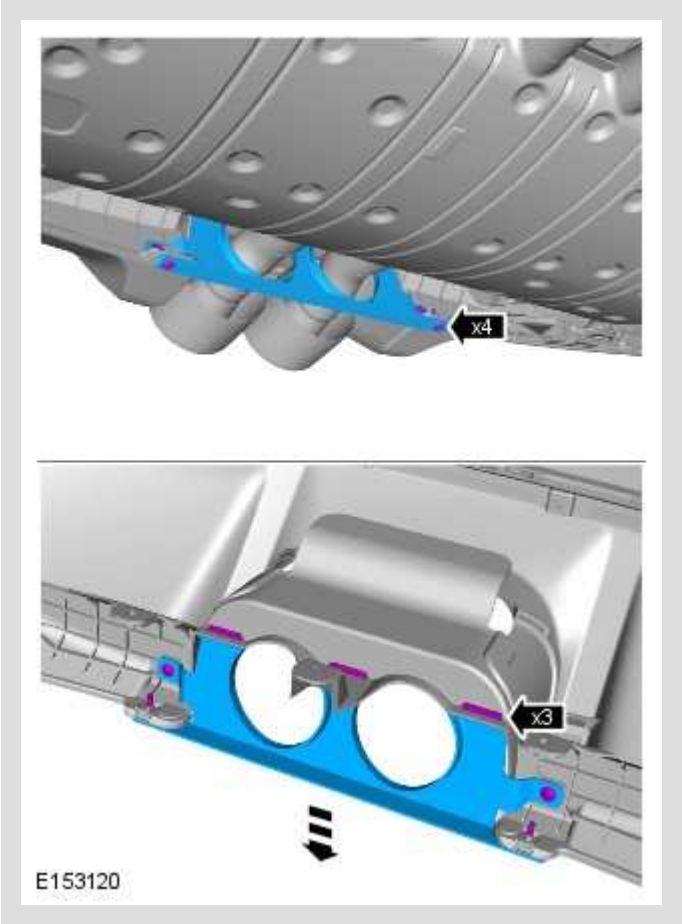
1. **WARNING:**

   Make sure to support the vehicle with axle stands.

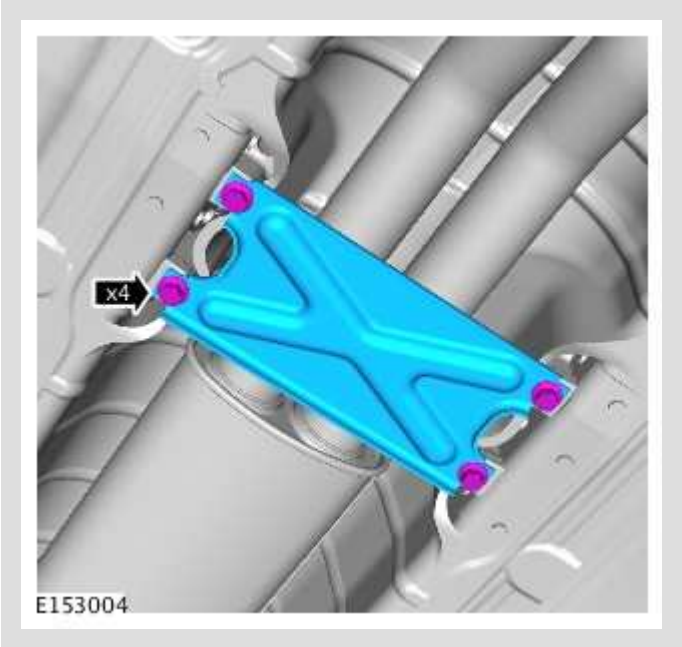
   Raise and support the vehicle.

2.

cardiagn.com



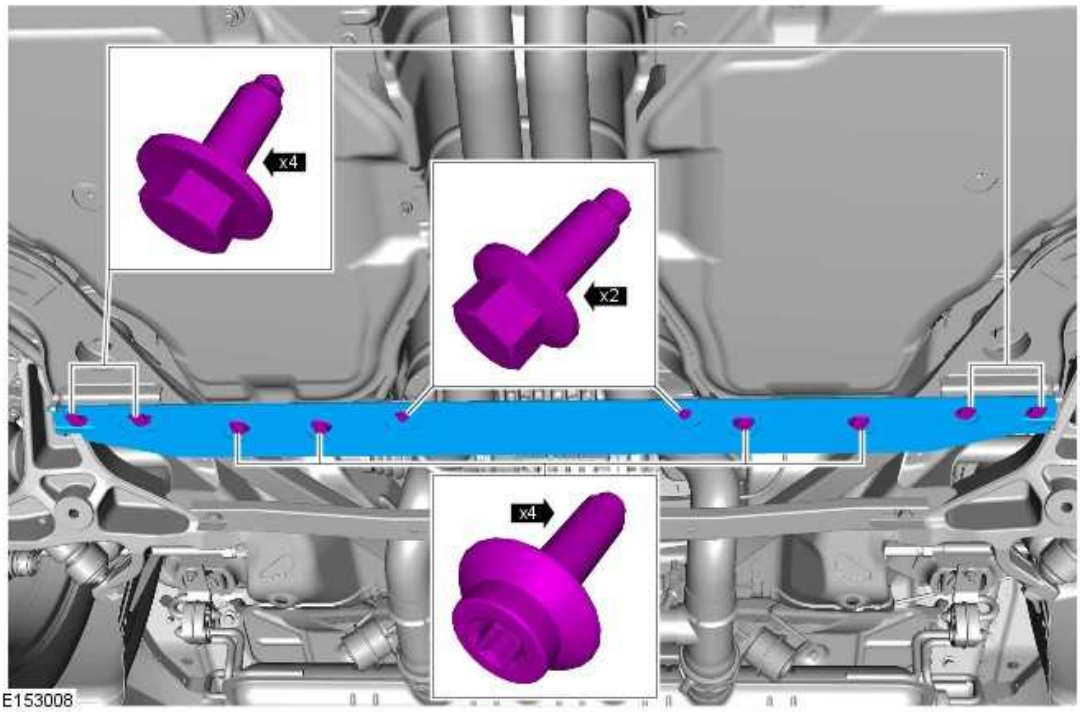
3.



Torque: **48 Nm**

4.

cardiagn.com



Torque:

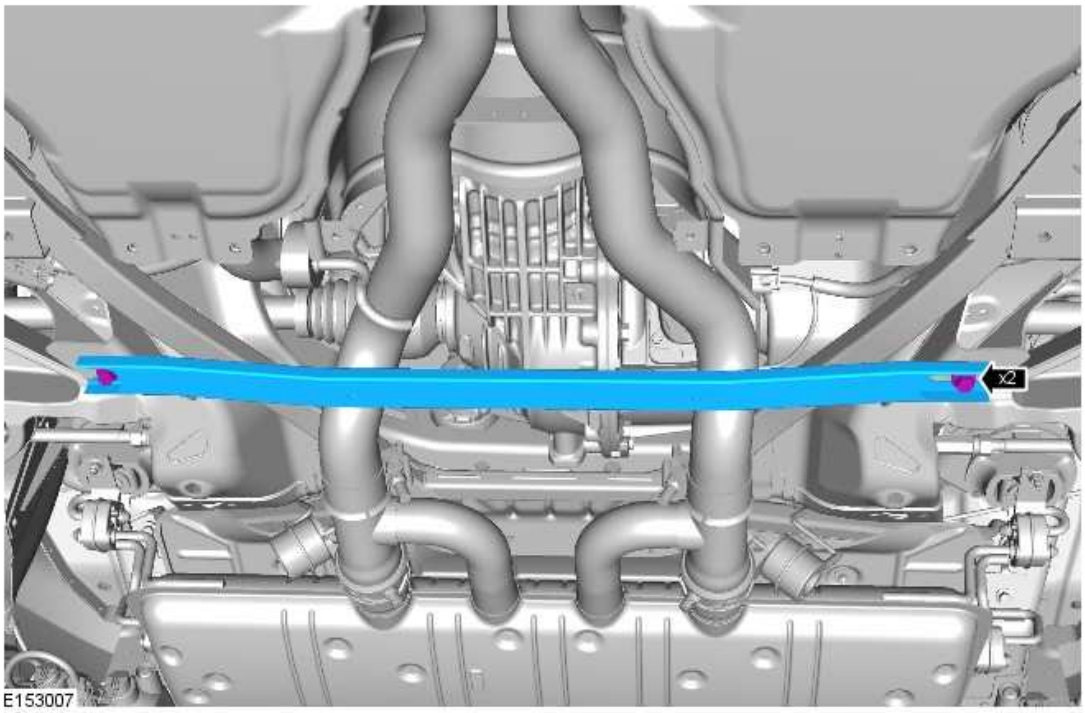
M8 bolts **25 Nm**

M6 bolts **4.8 Nm**

M8 torx bolts **20 Nm**

5.

cardiagn.com



Torque: **63 Nm**

6.

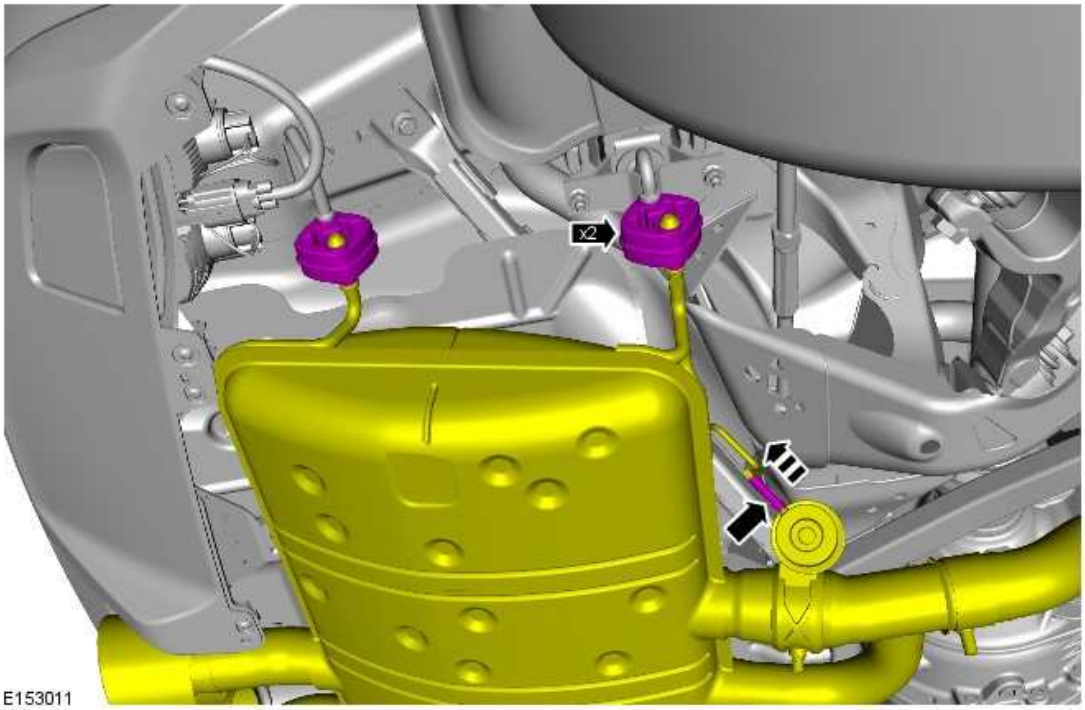
CAUTION:

Make sure that the exhaust system is supported with suitable retaining straps.

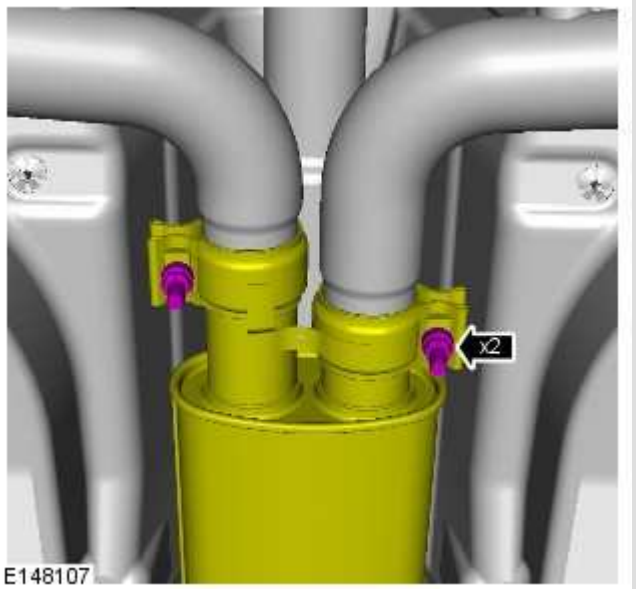
cardiagn.com

NOTE:

Repeat the procedure for the other side.



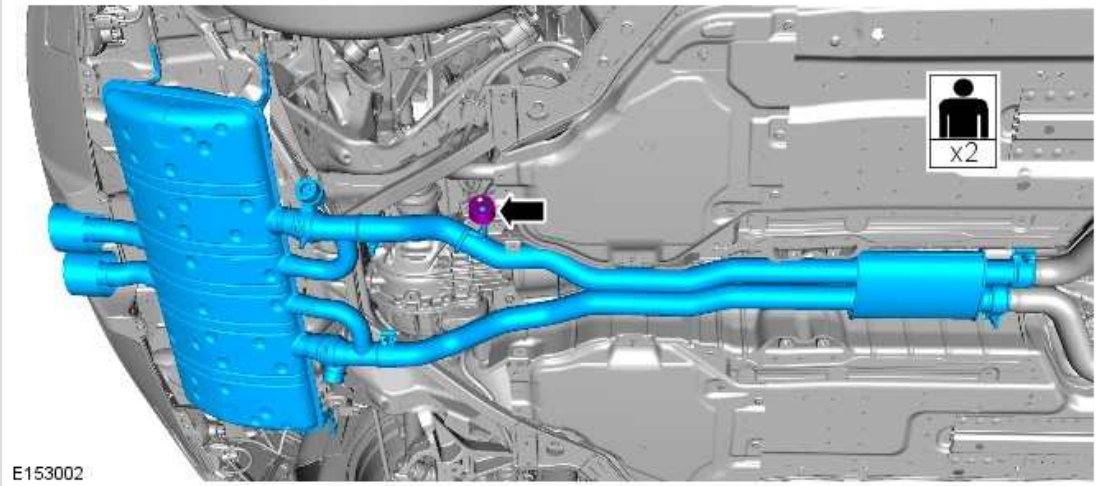
7.



Torque: **55 Nm**

8.

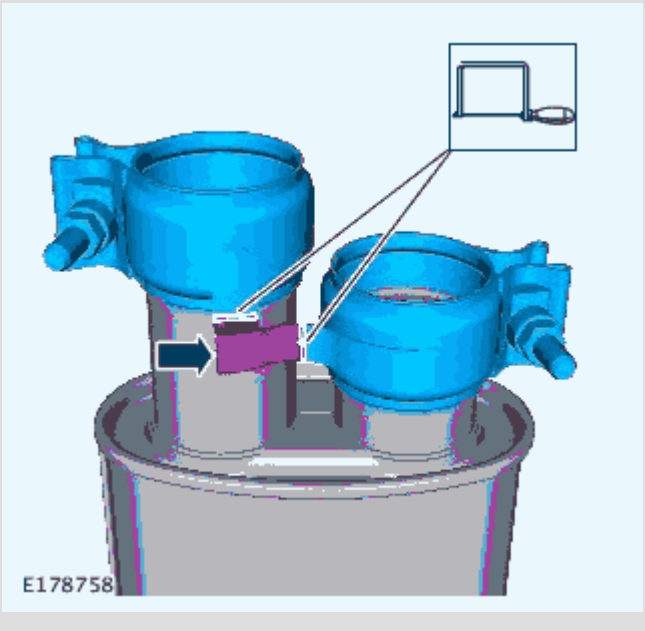
cardiagn.com



9.

CAUTION:

Do not carry out this step if a new exhaust is to be installed.



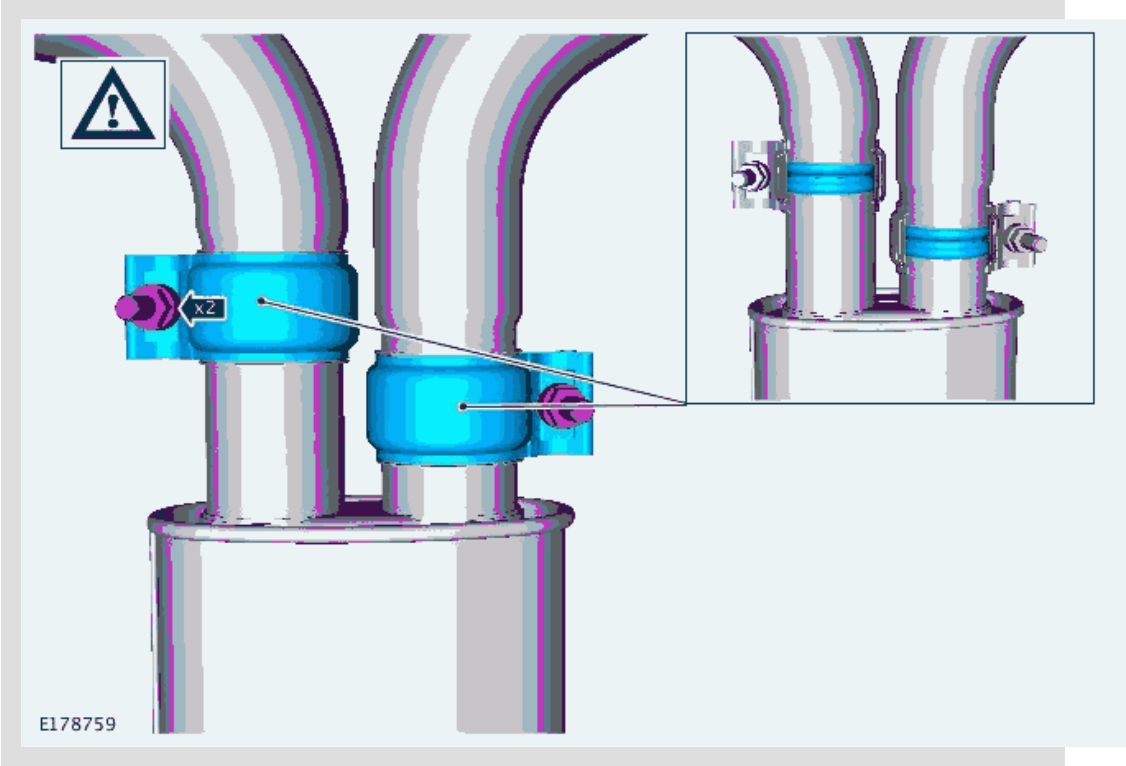
Remove the retaining clamps using a suitable tool.

cardiagn.com

INSTALLATION

1. **CAUTION:**

   Do not carry out this step if a new exhaust is to be installed.



Install new retaining clamps as illustrated.

2. To install, reverse the removal procedure.

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

EXHAUST MANIFOLD RH (G1584110)

REMOVAL AND INSTALLATION

30.15.56	EXHAUST MANIFOLD RIGHT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	2.8	USED WITHINS	

SPECIAL TOOL(S)

303-1444-01

Exhaust Manifold Installation Guide Pins - Threaded

cardiagn.com

	303-1444-02 Exhaust Manifold Installation Guide Pins - Unthreaded

REMOVAL

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2.

cardiagn.com

WARNING:

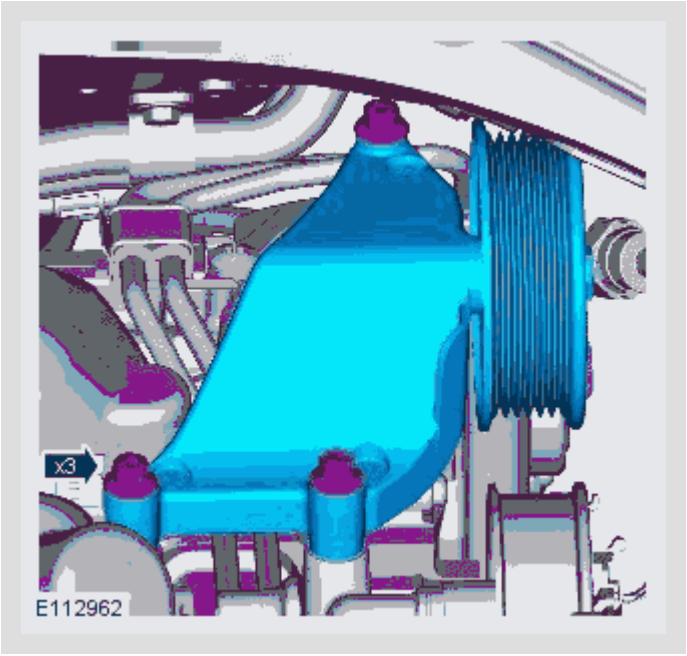
Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

3. Refer to: Exhaust System (309-00A Exhaust System - V6 S/C 3.0L Petrol, Removal and Installation).

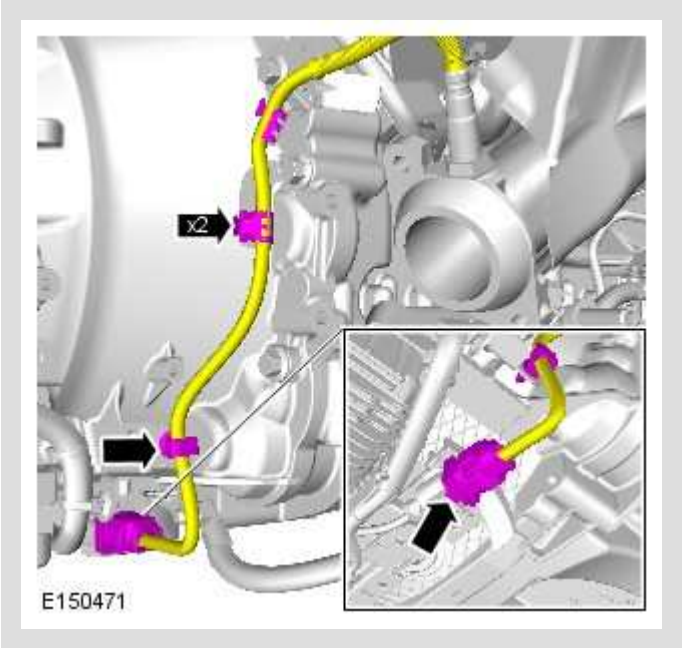
4. Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

5. Refer to: Engine Mount RH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

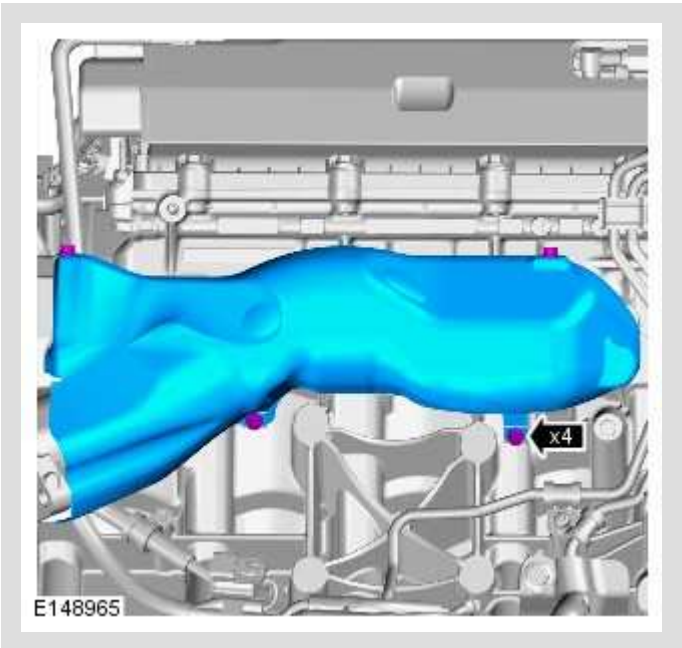
6. 

7.

cardiagn.com



8.



9.

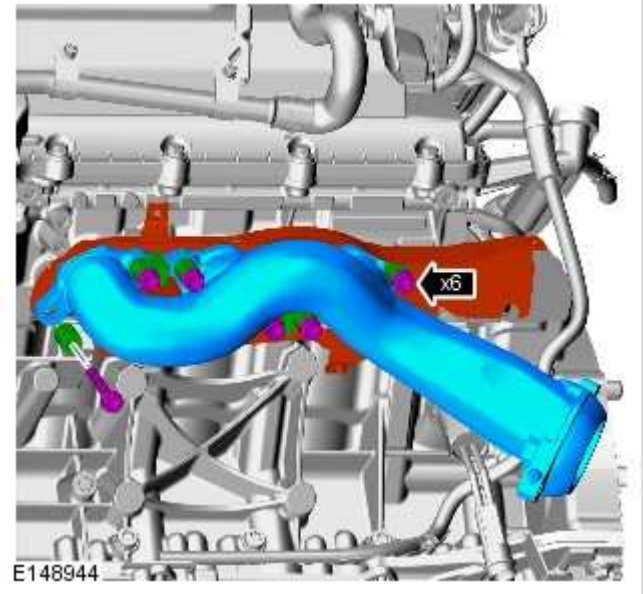
cardiagn.com

CAUTIONS:

- Discard the bolts.
- LH illustration shown, RH is similar.

NOTES:

- Discard the gasket.
- Make sure that the position of the spacers is noted before removal of the manifold.

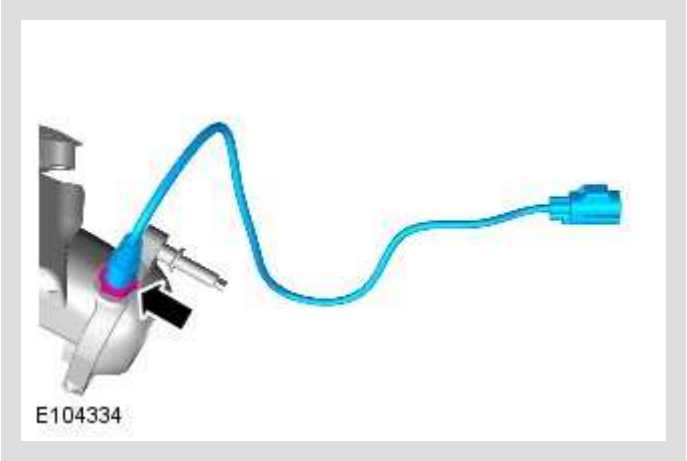


10.

NOTE:

Do not disassemble further if the component is removed for access only.

cardiagn.com



INSTALLATION

1.

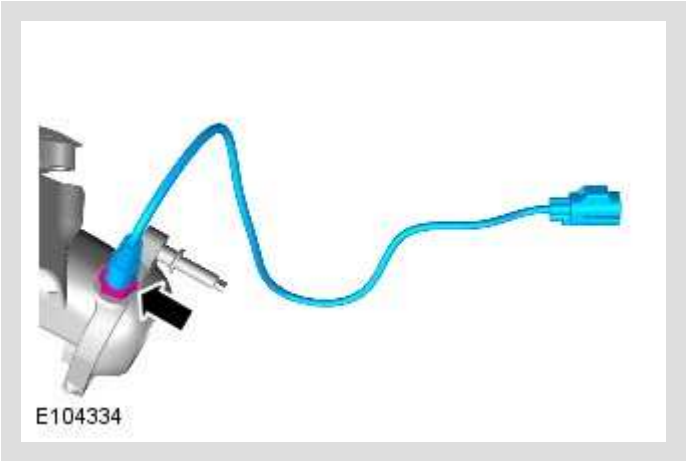
CAUTIONS:

- Make sure that the mating faces are clean and free of foreign material.
- Make sure the anti-seize compound does not contact the HO2S tip.

NOTE:

If the original sensor is to be installed, apply lubricant meeting specification ESE-M12A4-A to the thread of the sensor.

cardiagn.com



Torque: **45 Nm**

2.

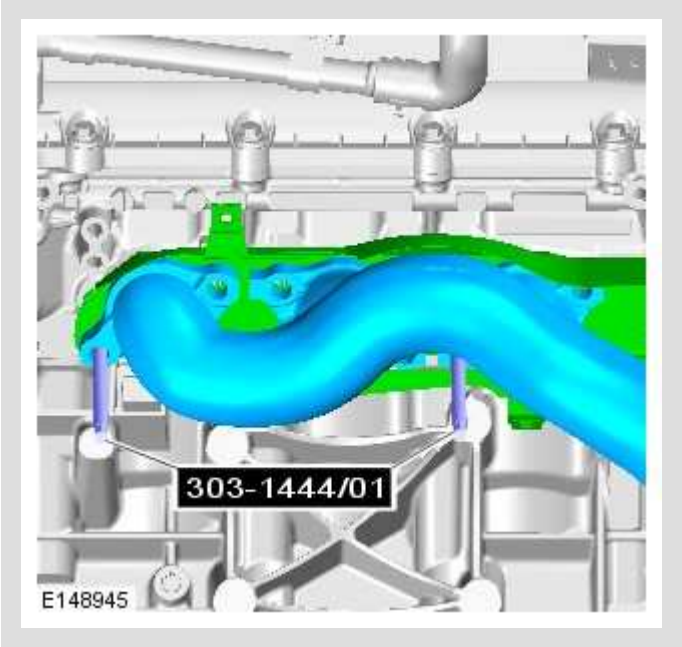
CAUTION:

LH illustration shown, RH is similar.

NOTE:

Install a new gasket.

cardiagn.com



Special Tool(s): 303-1444-01

3.

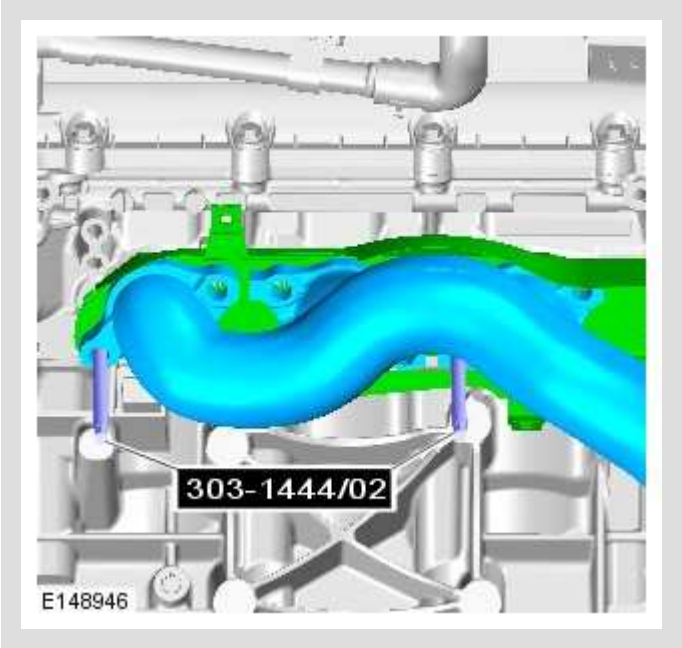
CAUTION:

LH illustration shown, RH is similar.

NOTE:

If a new cylinder head is installed use the special tools in the illustration.

cardiagn.com



Special Tool(s): 303-1444-02

4.

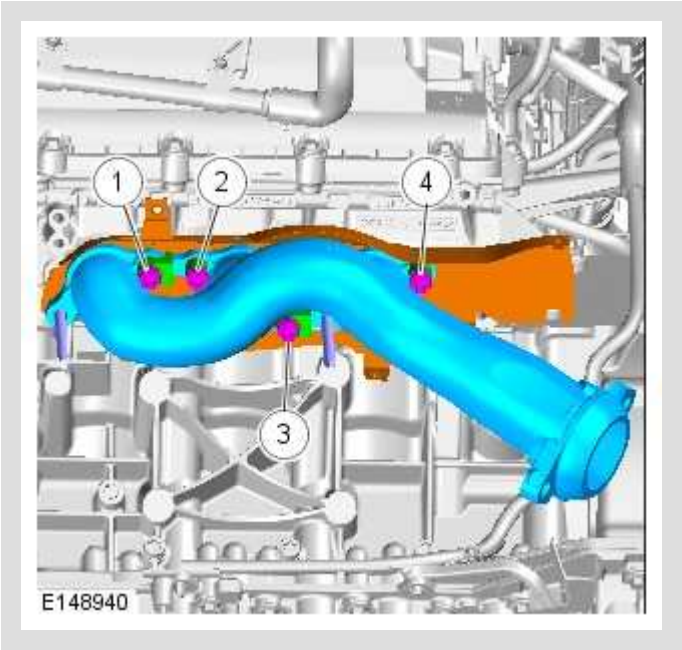
CAUTIONS:

- Make sure that new bolts are installed.
- LH illustration shown, RH is similar.

NOTE:

Install the spacers in the noted position.

cardiagn.com



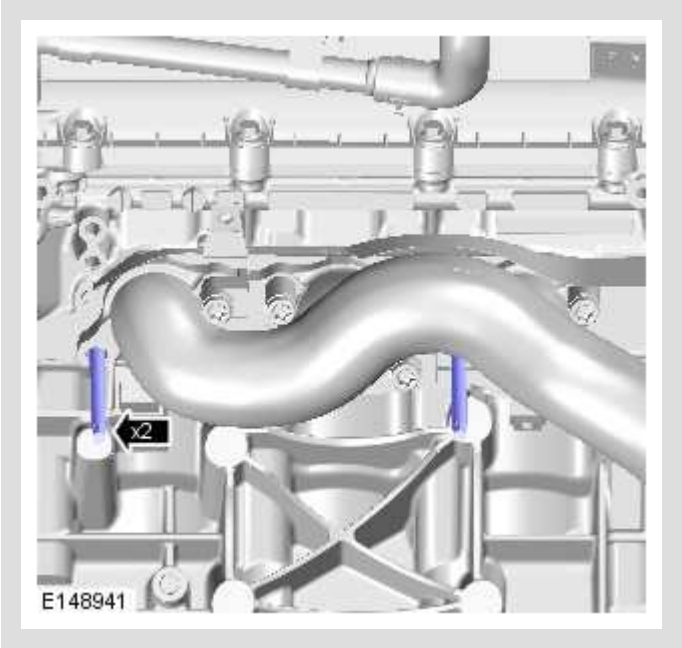
Torque: **10 Nm**

5.

CAUTION:

LH illustration shown, RH is similar.

cardiagn.com



Remove the special tool.

6.

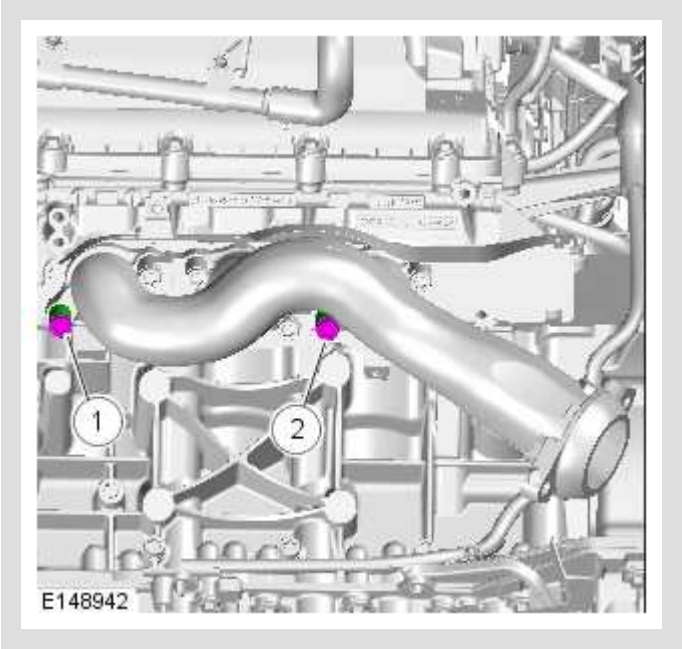
CAUTIONS:

- Make sure that new bolts are installed.
- LH illustration shown, RH is similar.

NOTE:

Install the spacers in the noted position.

cardiagn.com



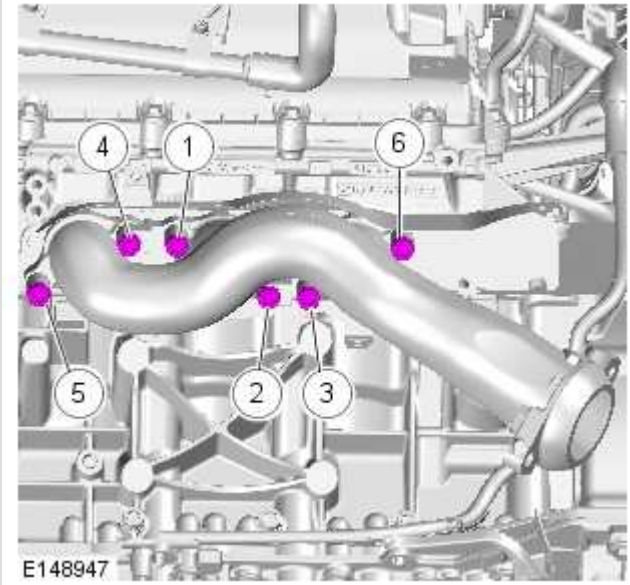
Torque: **10 Nm**

7.

CAUTIONS:

- LH illustration shown, RH is similar.
- Tighten the bolts in the sequence shown.

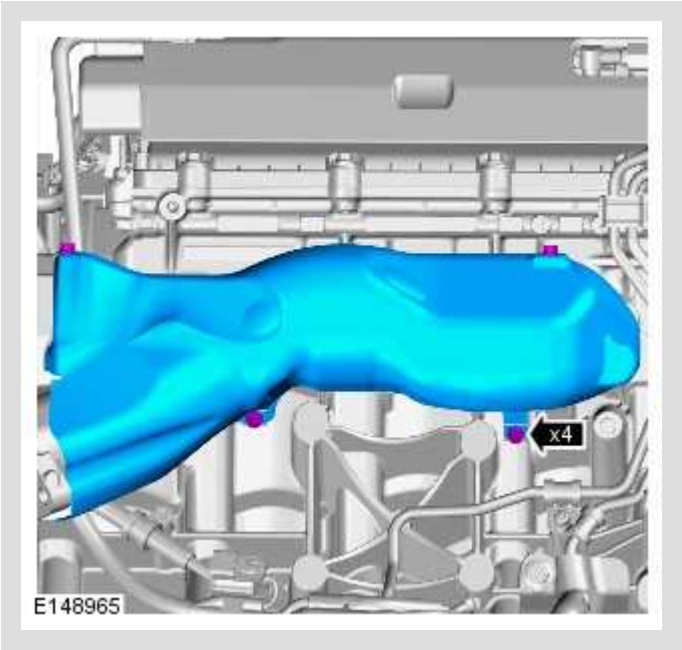
cardiagn.com



Torque: **18 Nm**

8.

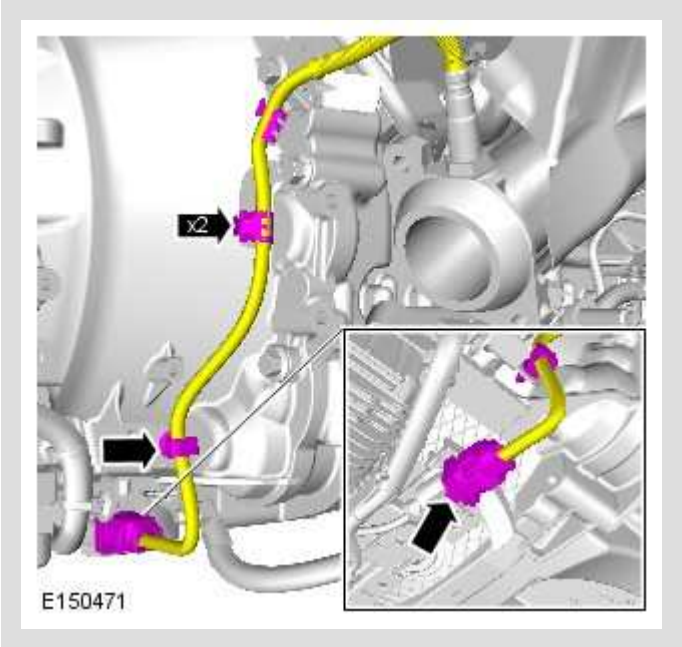
cardiagn.com



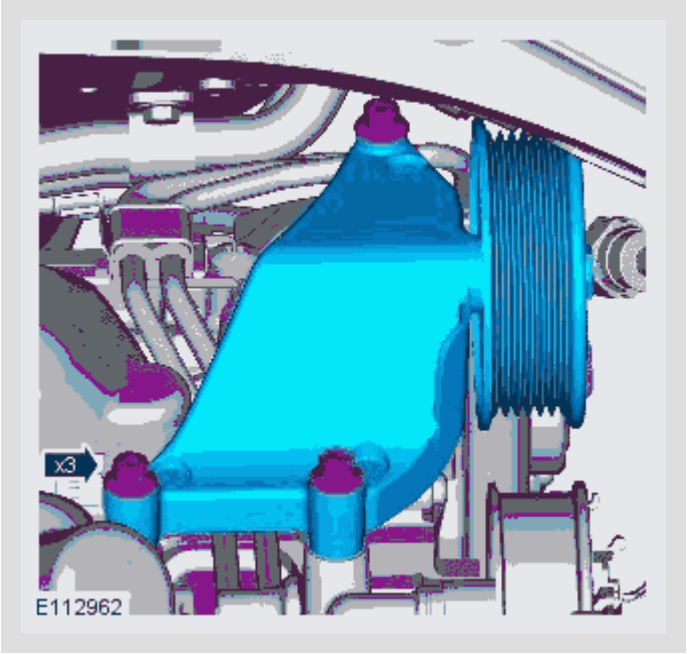
Torque: **3 Nm**

9.

cardiagn.com



10.



Torque: **25 Nm**

11. Refer to: Engine Mount RH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

12. Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

13. Refer to: Exhaust System (309-00A Exhaust System - V6 S/C 3.0L Petrol, Removal and Installation).

cardiagn.com

14. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 303-01

ENGINE - V8 S/C 5.0L PETROL

ENGINE MOUNT RH (G1584108)

REMOVAL AND INSTALLATION

12.45.03	ENGINE MOUNTING - RIGHT HAND - RENEW	RIGHT HAND DRIVE	0.8	USED WITHINS	

REMOVAL

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.

All vehicles

cardiagn.com

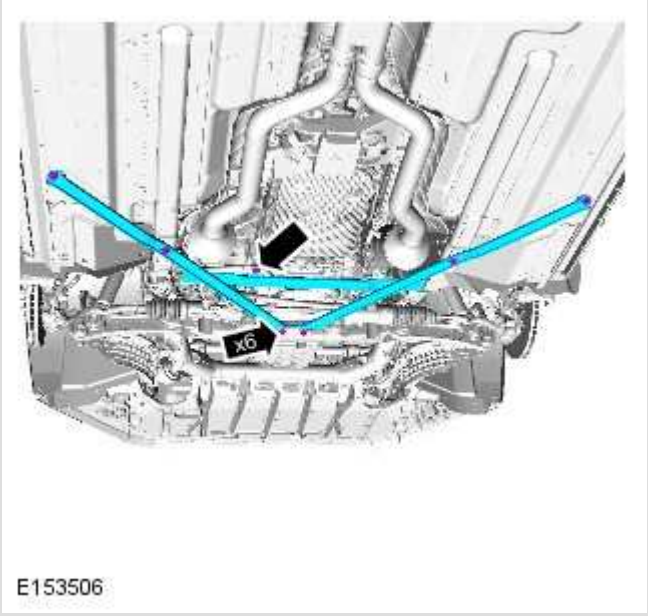
1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

3. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

4. 

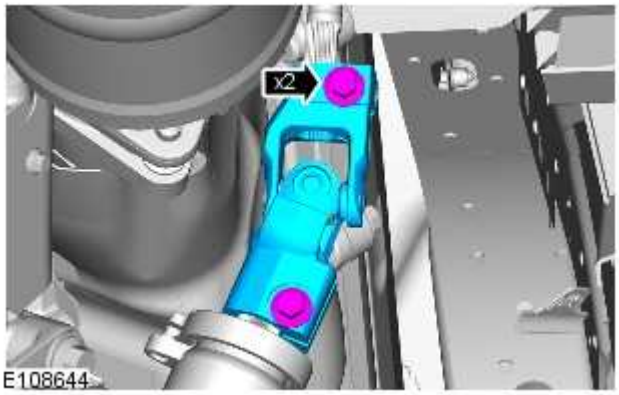
   Torque: **55 Nm**

Right-hand drive vehicles

1. **CAUTIONS:**

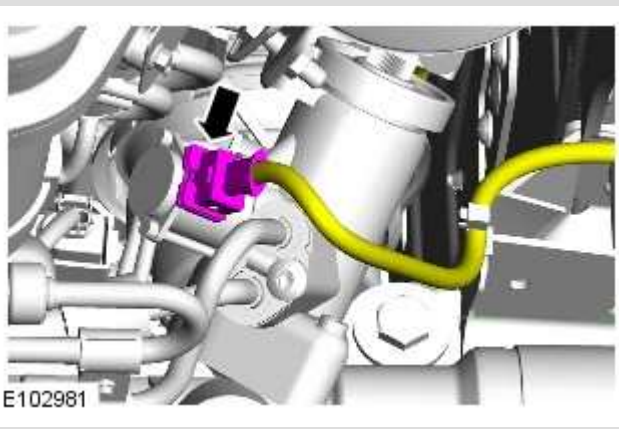
   - Discard the bolts.
   - Make sure that new bolts are installed.

cardiagn.com

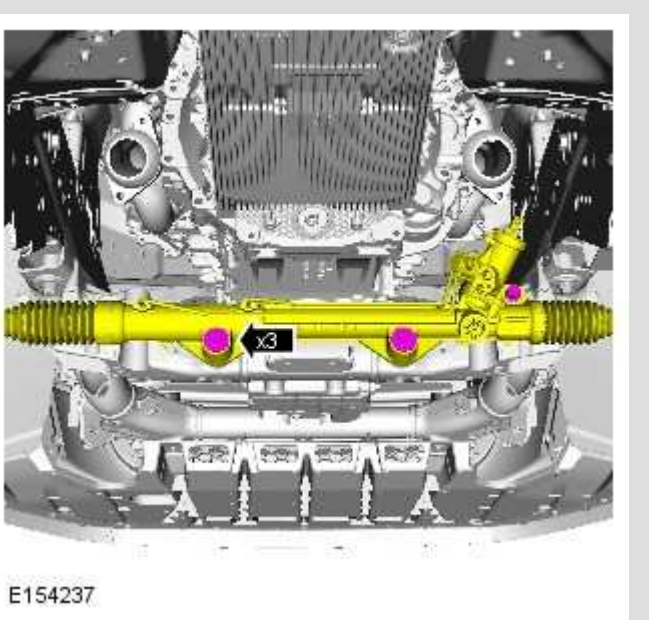


Torque: **35 Nm**

2.



3.



Torque: **100 Nm**

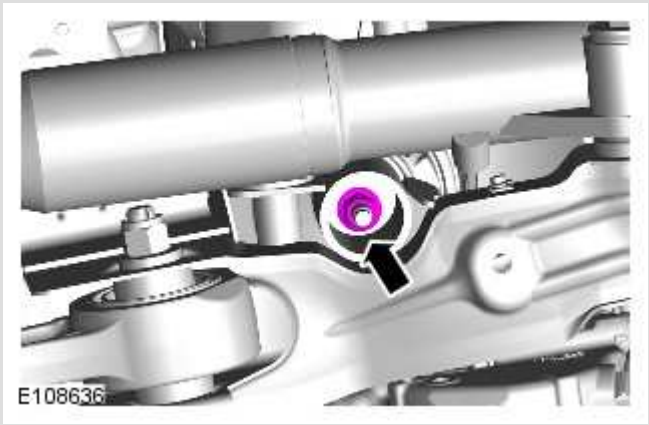
All vehicles

cardiagn.com

1.

NOTES:

- Remove and discard the nut.
- Make sure that a new nut is installed.



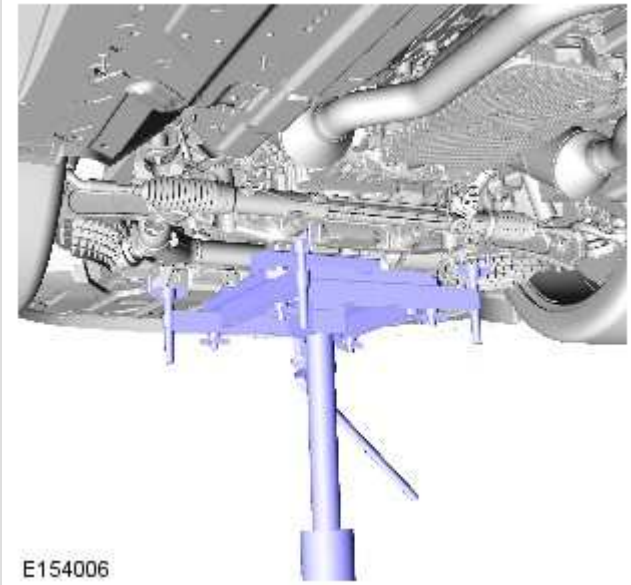
Torque: **63 Nm**

2.

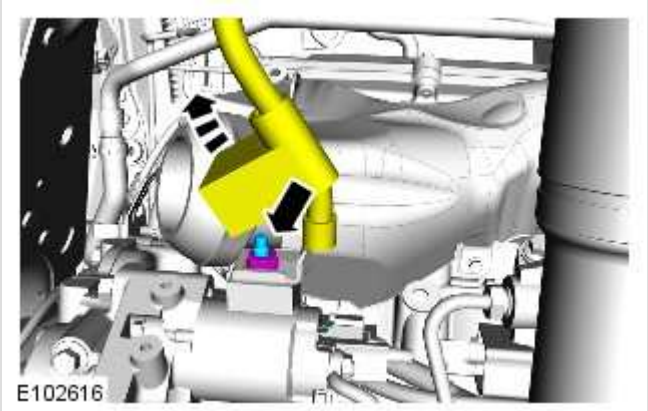
CAUTIONS:

- Support the engine on a jack. The angle may need to be adjusted during this procedure.
- Use a wooden block to protect the oil pan when supporting the engine.

cardiagn.com



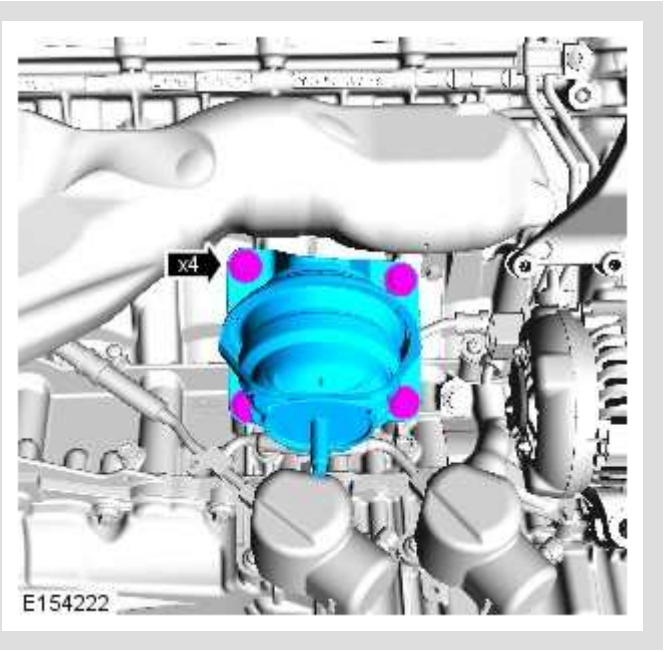
3.



Torque: **12 Nm**

4.

cardiagn.com



Torque: **48 Nm**

5.

NOTES:

- Do not disassemble further if the component is removed for access only.
- Remove and discard the nut.
- Make sure that a new nut is installed.

cardiagn.com

Torque: **48 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

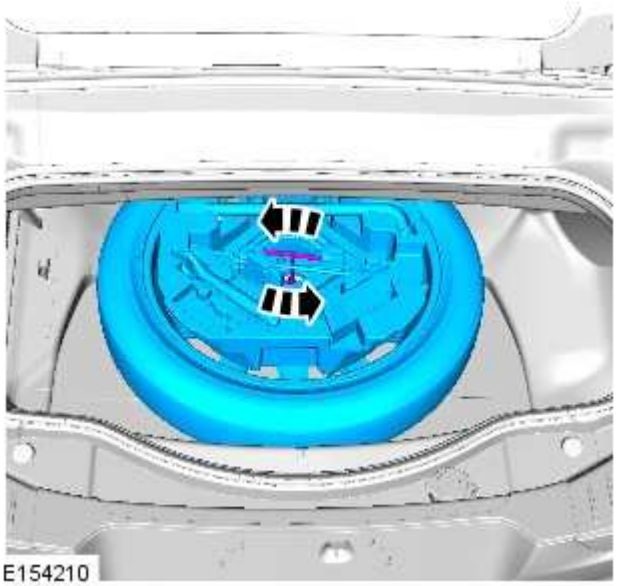
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

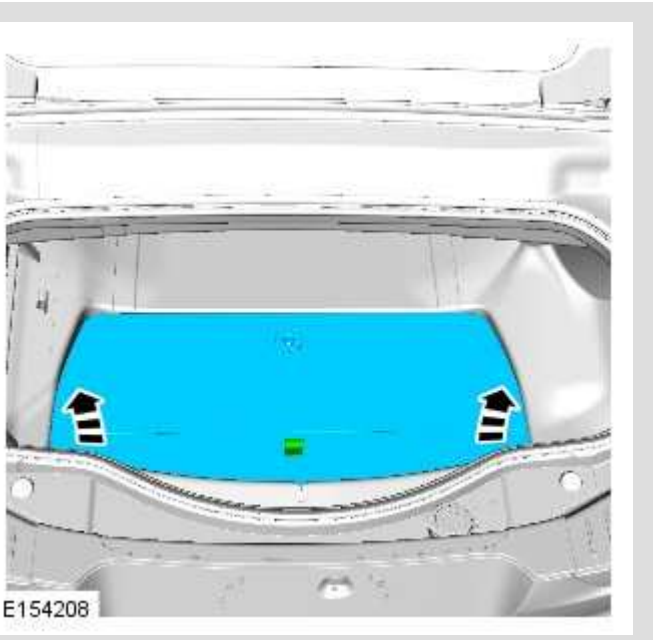
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

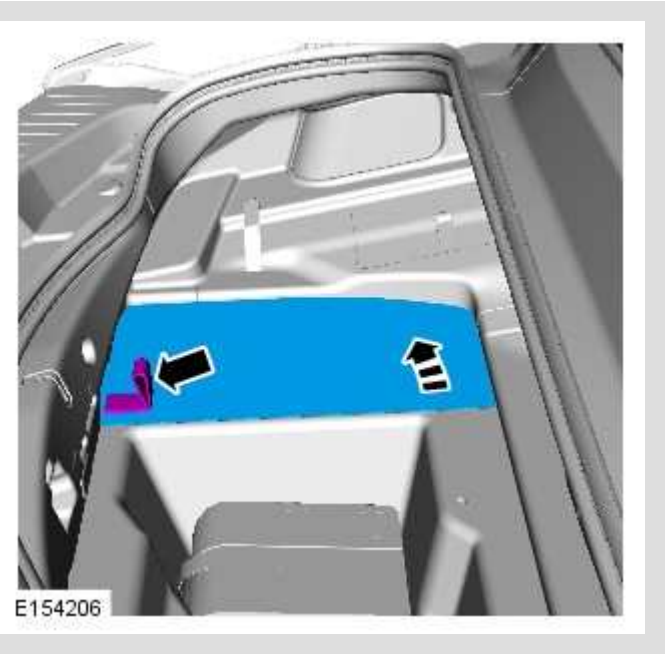


4.



5.

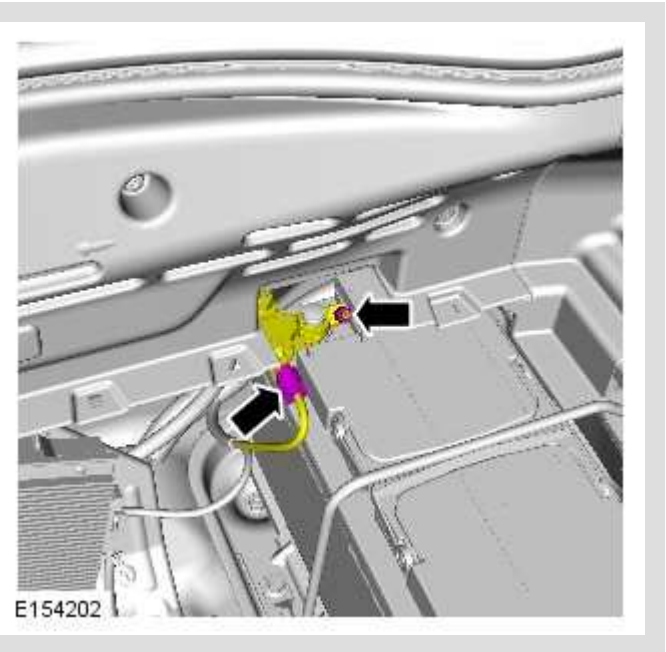
cardiagn.com



6.

CAUTION:

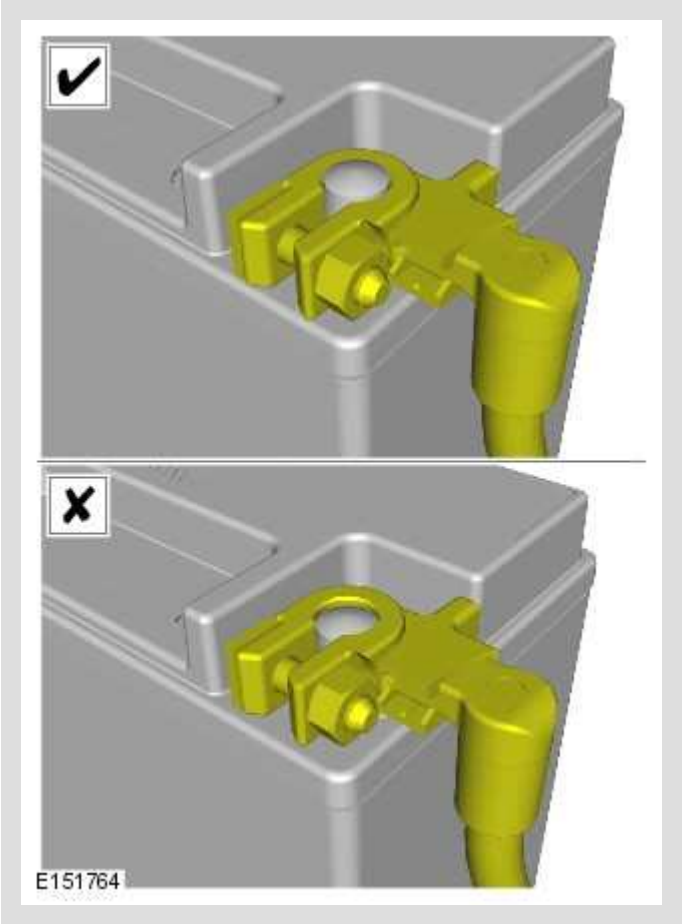
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

2015.0 F-TYPE (X152), 309-00

EXHAUST SYSTEM - V6 S/C 3.0L PETROL

EXHAUST SYSTEM (G1580322)

REMOVAL AND INSTALLATION

30.10.01	EXHAUST SYSTEM - RENEW	3000 CC, AJ V6 (AJ126)	0.8	USED WITHINS	
30.10.01	EXHAUST SYSTEM - RENEW	SVR	0.8	USED WITHINS	

REMOVAL

WARNING:

Observe due care when working near a hot exhaust system.

NOTE:

Removal steps in this procedure may contain installation details.

cardiagn.com

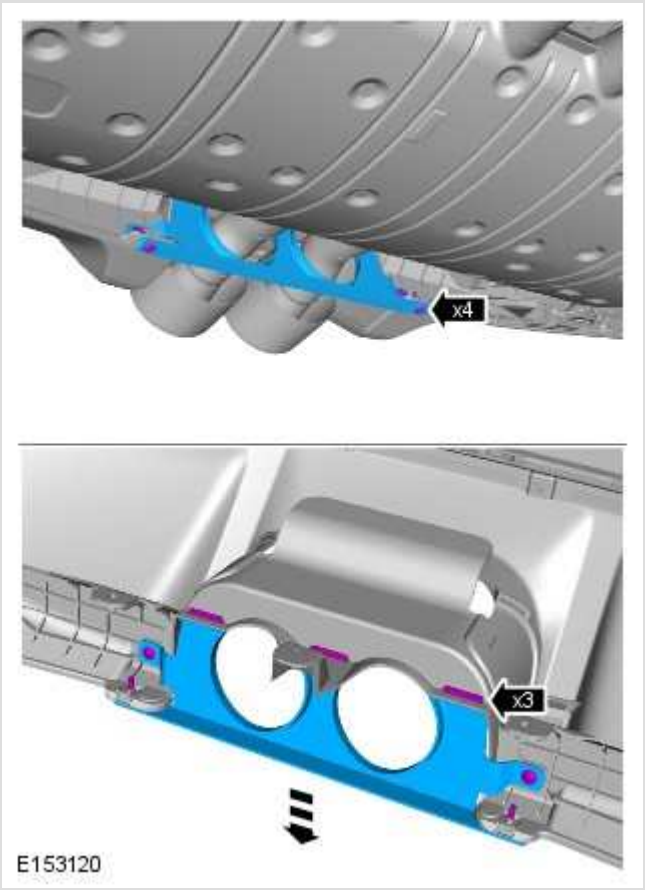
1.

⚠ WARNING:

Make sure to support the vehicle with axle stands.

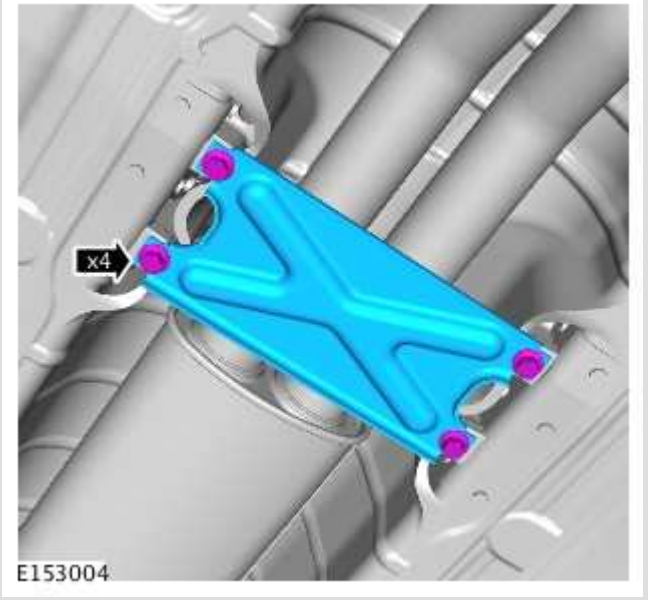
Raise and support the vehicle.

2.



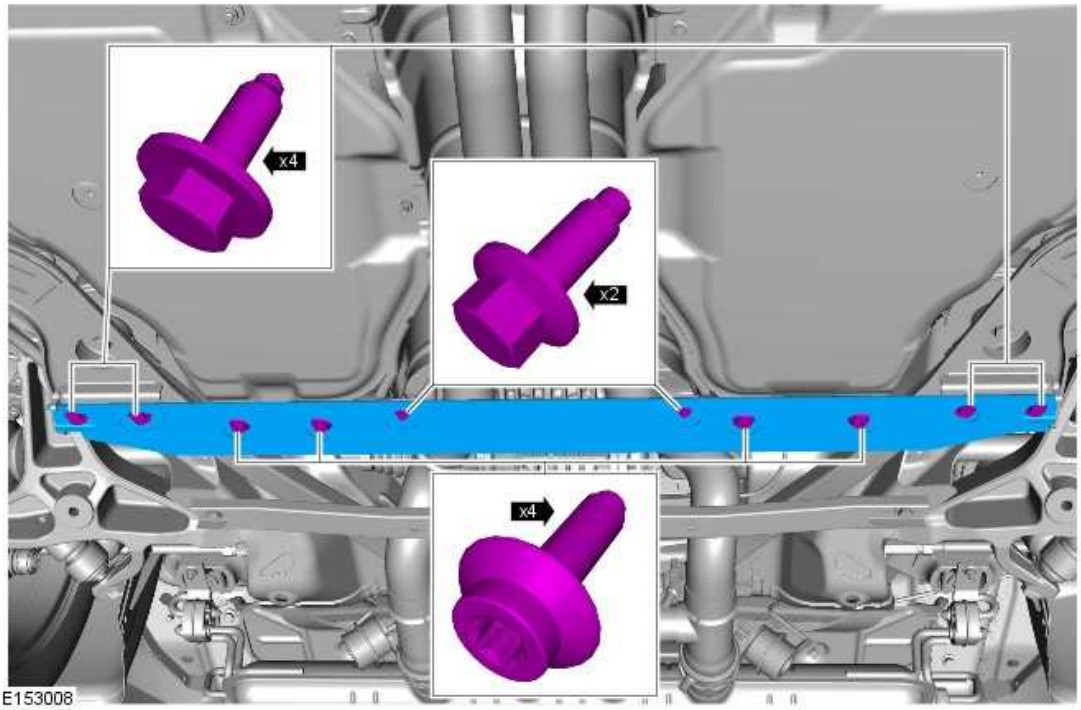
3.

cardiagn.com



Torque: **48 Nm**

4.



Torque:

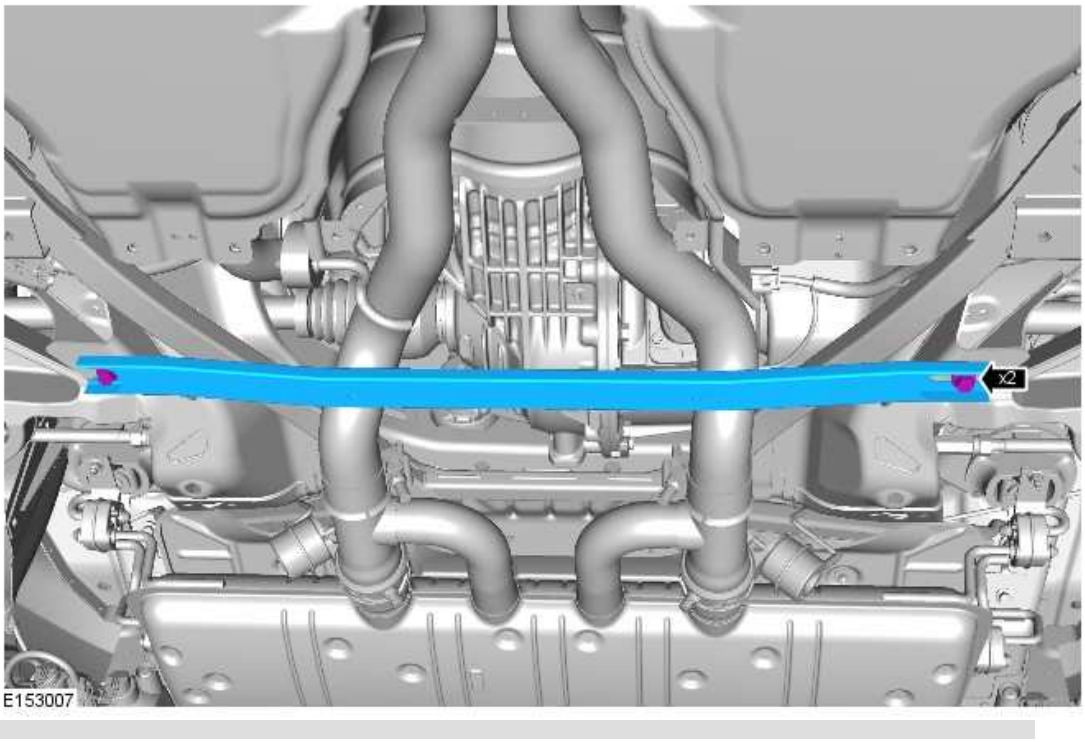
M8 bolts **25 Nm**

M6 bolts **4.8 Nm**

M8 torx bolts **20 Nm**

5.

cardiagn.com



Torque: **63 Nm**

6.

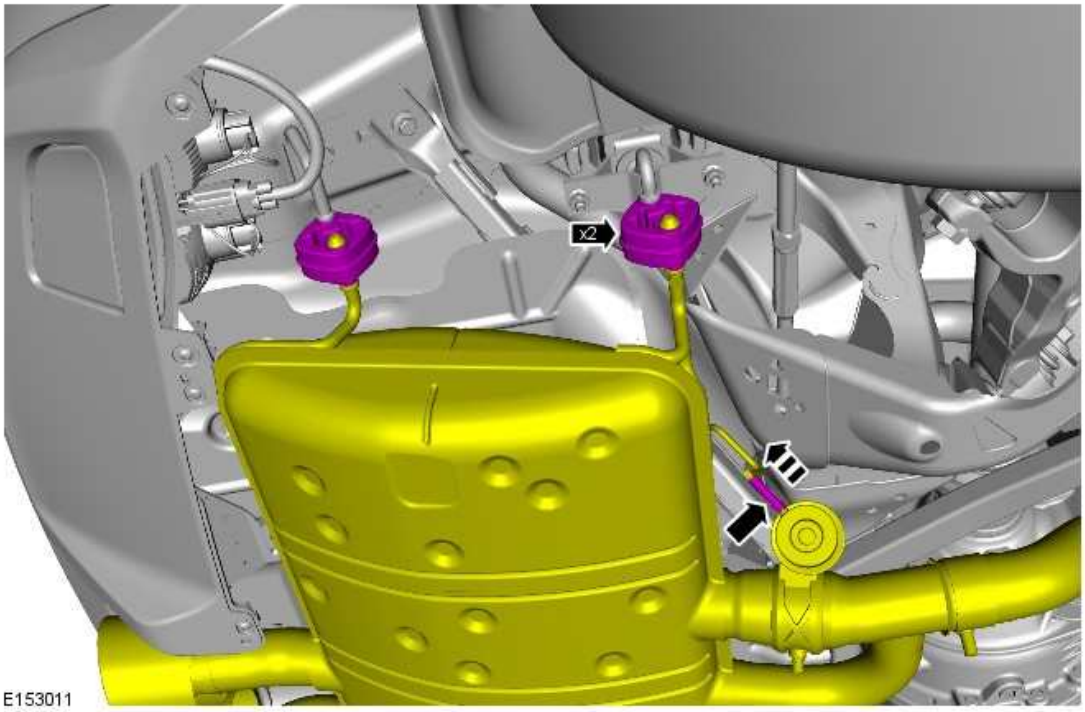
CAUTION:

Make sure that the exhaust system is supported with suitable retaining straps.

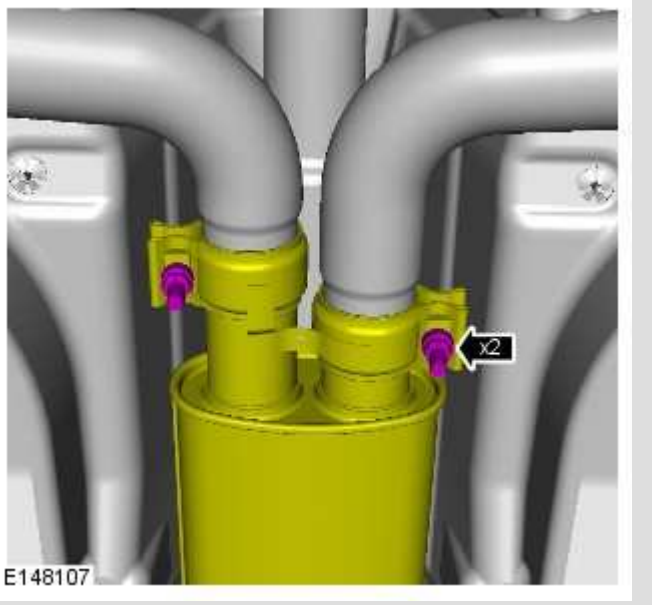
NOTE:

Repeat the procedure for the other side.

cardiagn.com



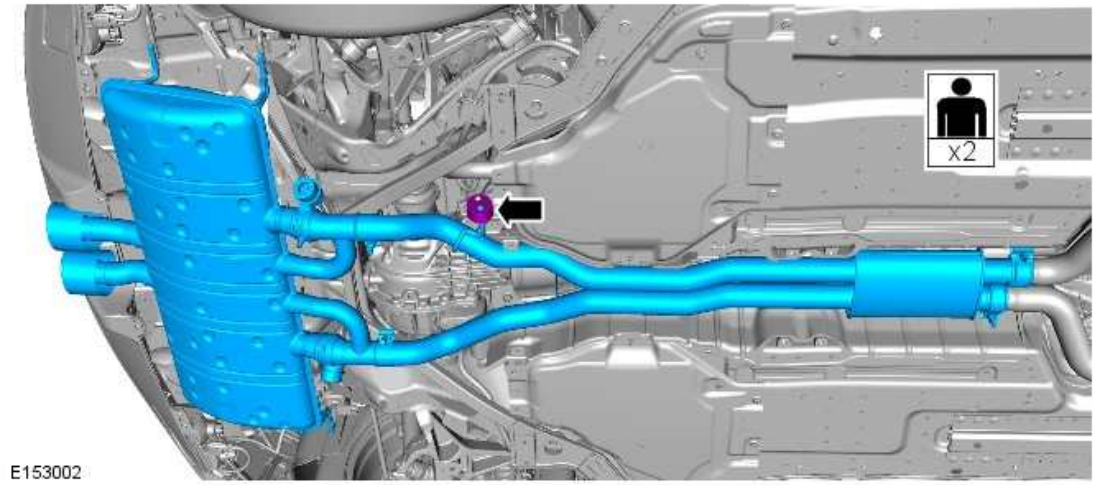
7.



Torque: **55 Nm**

cardiagn.com

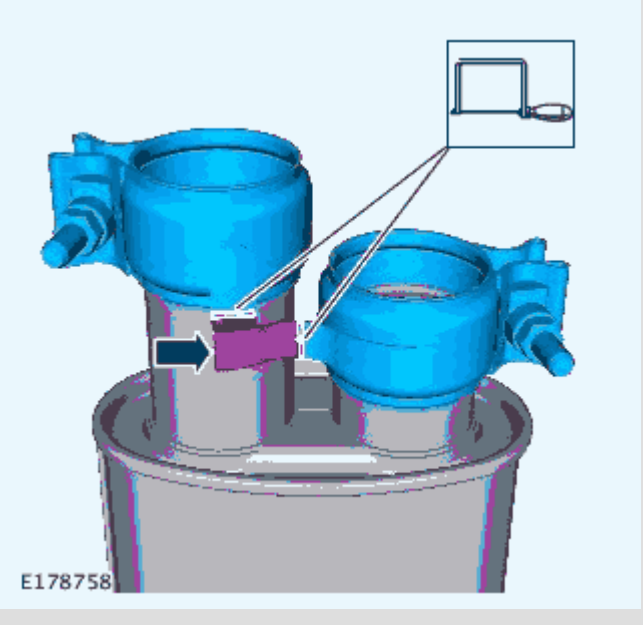
8.



9.

CAUTION:

Do not carry out this step if a new exhaust is to be installed.



Remove the retaining clamps using a suitable tool.

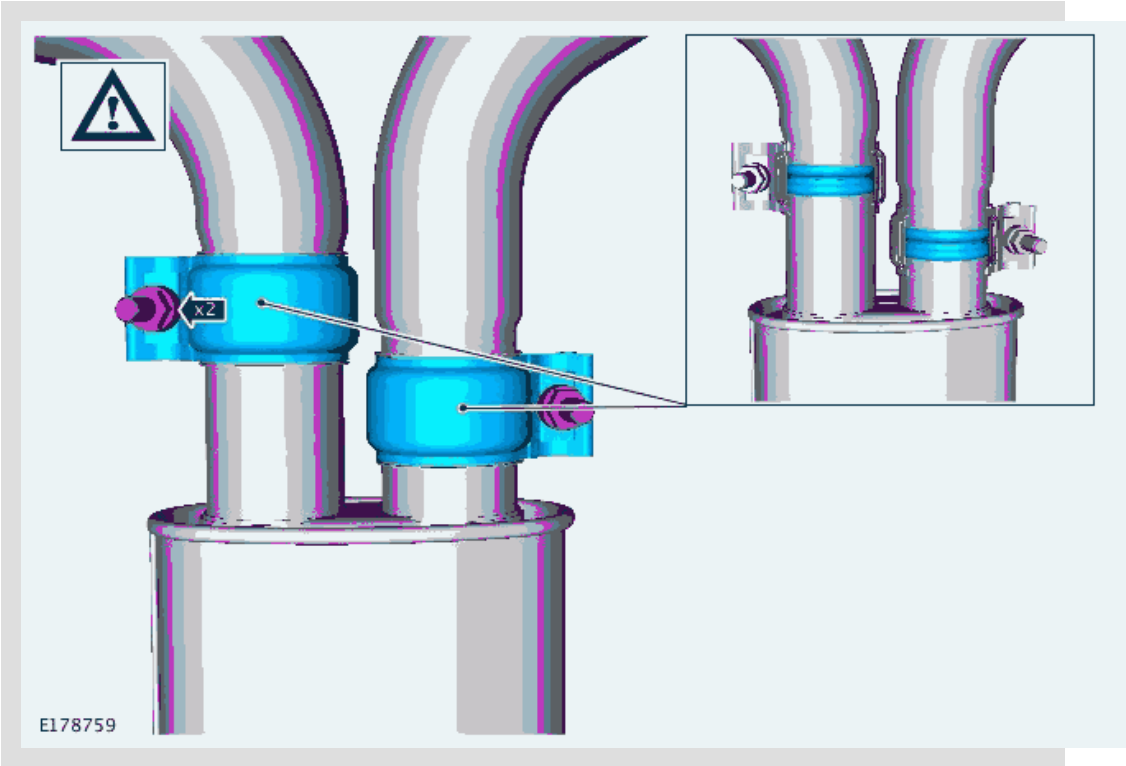
INSTALLATION

1.

CAUTION:

cardiagn.com

Do not carry out this step if a new exhaust is to be installed.



Install new retaining clamps as illustrated.

2. To install, reverse the removal procedure.

cardiagn.com

2015.0 F-TYPE (X152), 303-05

ACCESSORY DRIVE - V6 S/C 3.0L PETROL

ACCESSORY DRIVE BELT (G1580332)

REMOVAL AND INSTALLATION

12.10.40	DRIVE BELT - FRONT END ACCESSORY DRIVE - RENEW	ALL DERIVATIVES	0.9	USED WITHINS	

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Engine shown removed for clarity.

All vehicles

1. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

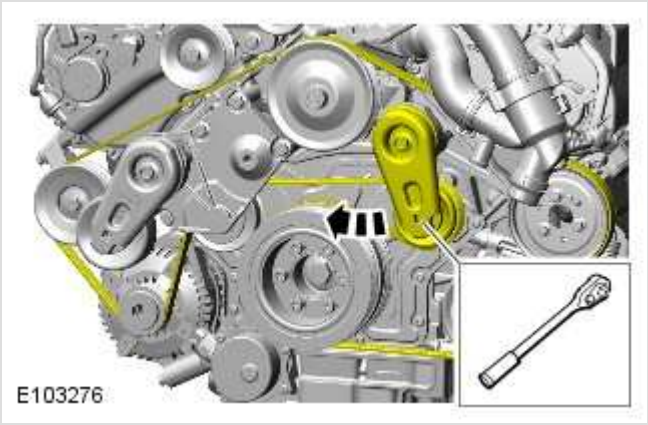
2. Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

Vehicles with hydraulic power steering

1. **NOTE:**

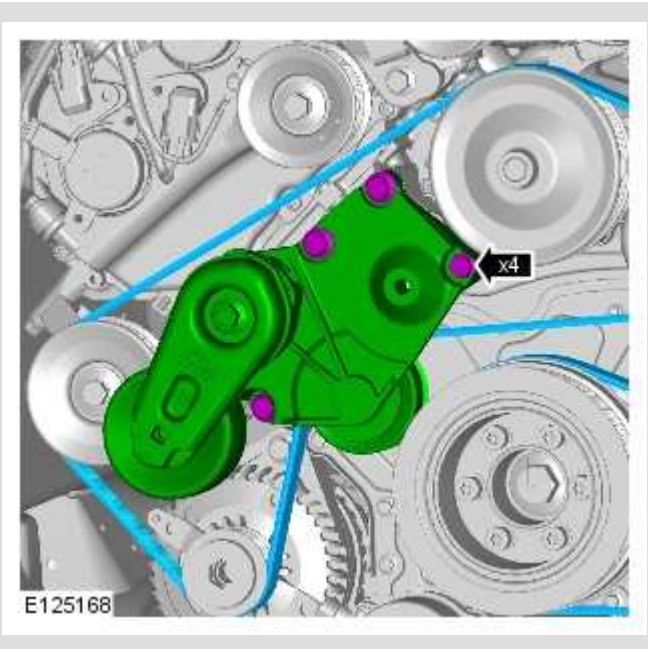
cardiagn.com

Note the fitted position of the accessory drive belt.



2. Refer to: Supercharger Belt Idler Pulley (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Supercharger Belt Idler Pulley (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

3.



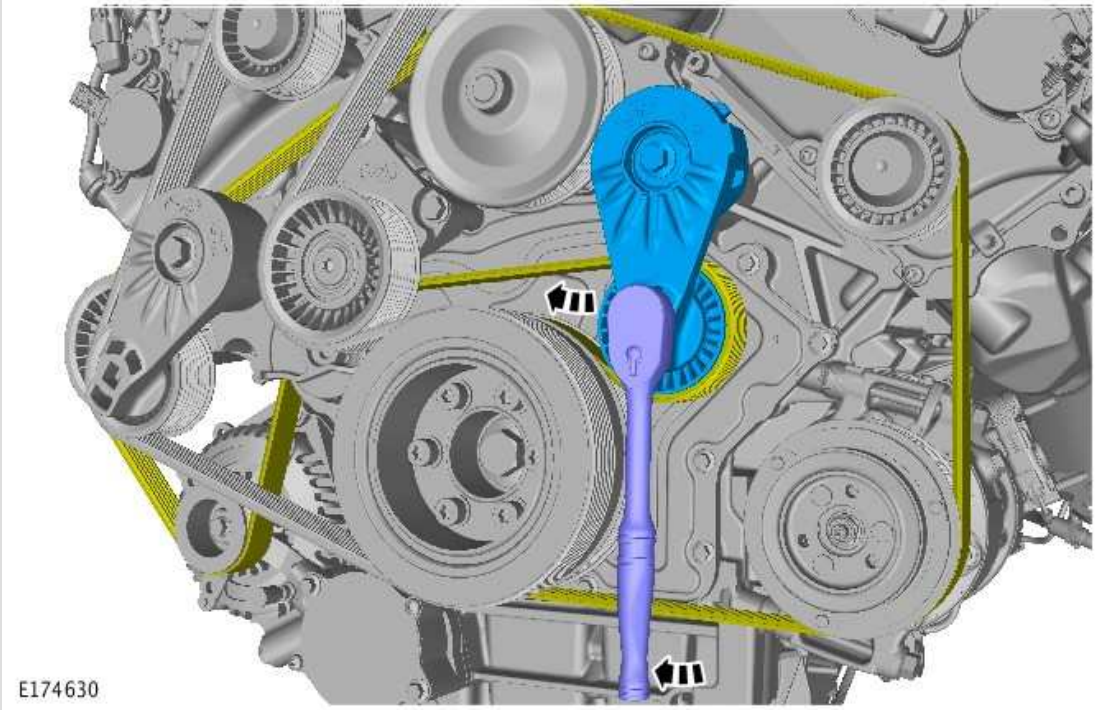
Torque: **25 Nm**

Vehicles with electric power steering

1. **NOTE:**

cardiagn.com

Note the fitted position of the accessory drive belt.

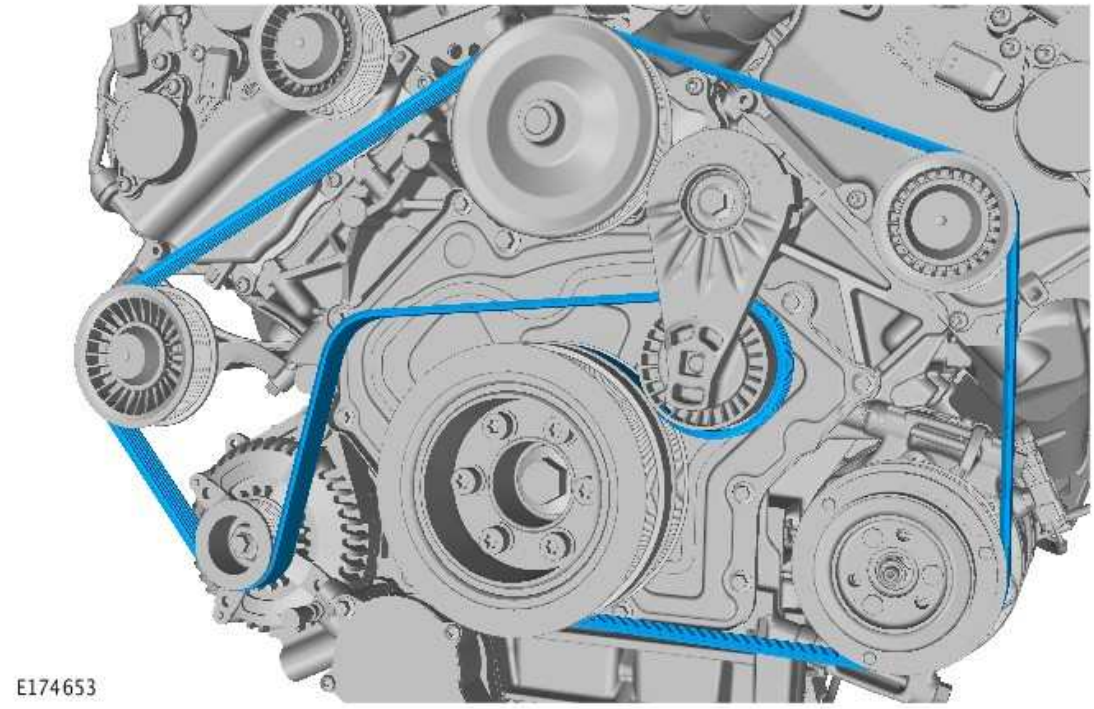


2.

Torque: **25 Nm**

3.

cardiagn.com



INSTALLATION

1.

CAUTION:

Make sure that the accessory drive belt is correctly located on each pulley.

To install, reverse the removal procedure.

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

FLEXPLATE (G1584111)

REMOVAL AND INSTALLATION

12.53.13	DRIVE PLATE - RENEW	3000 CC, AJ V6 (AJ126), 2WD	5.2	USED WITHINS	

SPECIAL TOOL(S)

JLR-303-1304

Locking Tool

REMOVAL

cardiagn.com

NOTES:

- Some components shown removed for clarity.
- Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. Refer to: Transmission (307-01A Automatic Transmission /Transaxle - V6 S/C 3.0L Petrol, Removal).
   Refer to: Transmission (307-01A Automatic Transmission /Transaxle - V6 S/C 3.0L Petrol, Removal).
   Refer to: Transmission (307-01B Automatic Transmission /Transaxle - V8 S/C 5.0L Petrol, Removal).

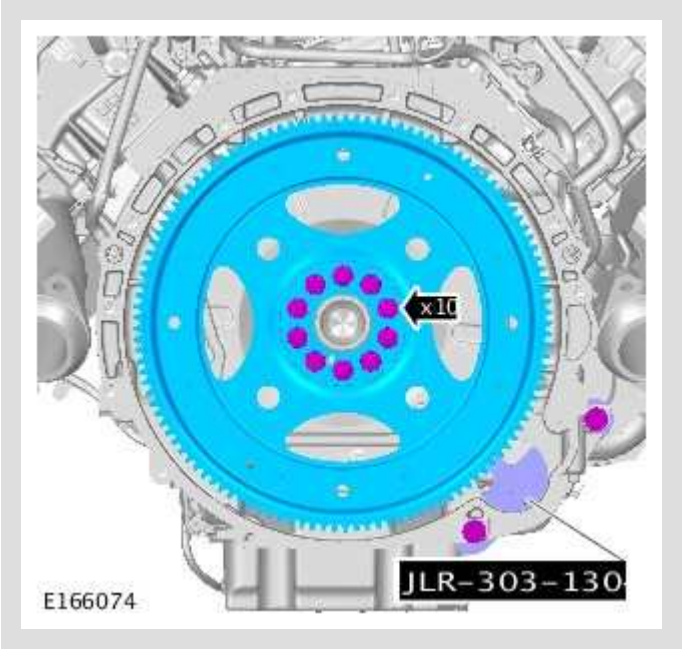
4. **CAUTIONS:**

   - The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
   - Make sure that no components fall off during removal.

cardiagn.com

NOTES:

- Make sure the crankshaft and flexplate mating faces are clean before installation.
- Make sure that the crankshaft is not rotated.



Install the special tool.
Special Tool(s): JLR-303-1304

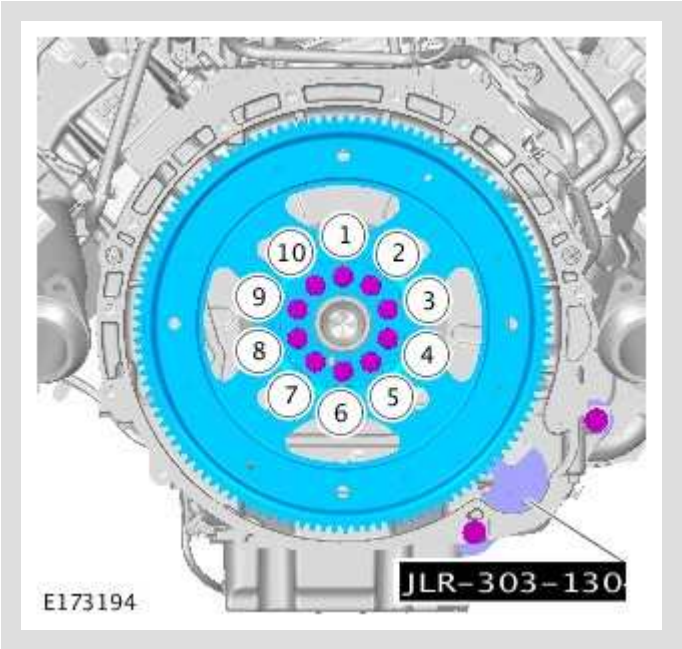
INSTALLATION

1.

CAUTIONS:

- The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
- Install all the bolts finger tight before final tightening.
- Install the bolts in the noted position.

cardiagn.com



Special Tool(s): JLR-303-1304

Torque:

Stage 1: **45 Nm**

Stage 2: **90°**

2. Remove the special tool.

3. Refer to: Transmission (307-01B Automatic Transmission /Transaxle - V8 S/C 5.0L Petrol, Installation).
Refer to: Transmission (307-01A Automatic Transmission /Transaxle - V6 S/C 3.0L Petrol, Installation).
Refer to: Transmission (307-01A Automatic Transmission /Transaxle - V6 S/C 3.0L Petrol, Installation).

4. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

AUTOMATIC TRANSMISSION/TRANSAXLE - V6 S/C 3.0L PETROL

TRANSMISSION (G1579985)

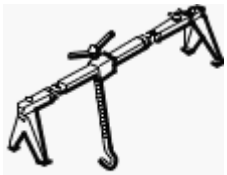
INSTALLATION

37.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	3.6	USED WITHINS	
44.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	4.9	USED WITHINS	
44.20.01.90	TRANSMISSION ASSEMBLY - REMOVE FOR ACCESS, AND INSTALL	3000 CC, AJ V6 (AJ126), 2WD	4.7	USED WITHINS	
86.75.50	FRONT SEAT TRACK MOTOR - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	

INSTALLATION

SPECIAL TOOL(S)

cardiagn.com

	**303-021** Engine support bracket
	303-1435 Engine Lifting Brackets Rear

NOTES:

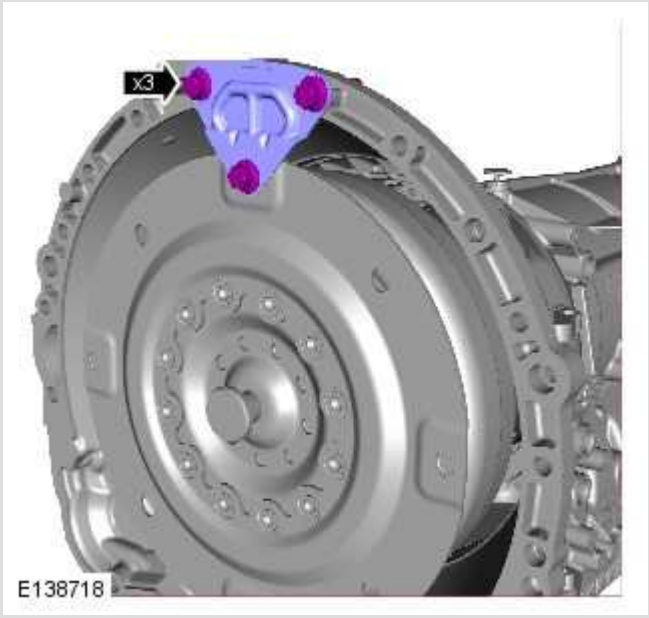
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the transmission removed for clarity.

cardiagn.com

1.

NOTE:

This step is only required if a new component is installed.

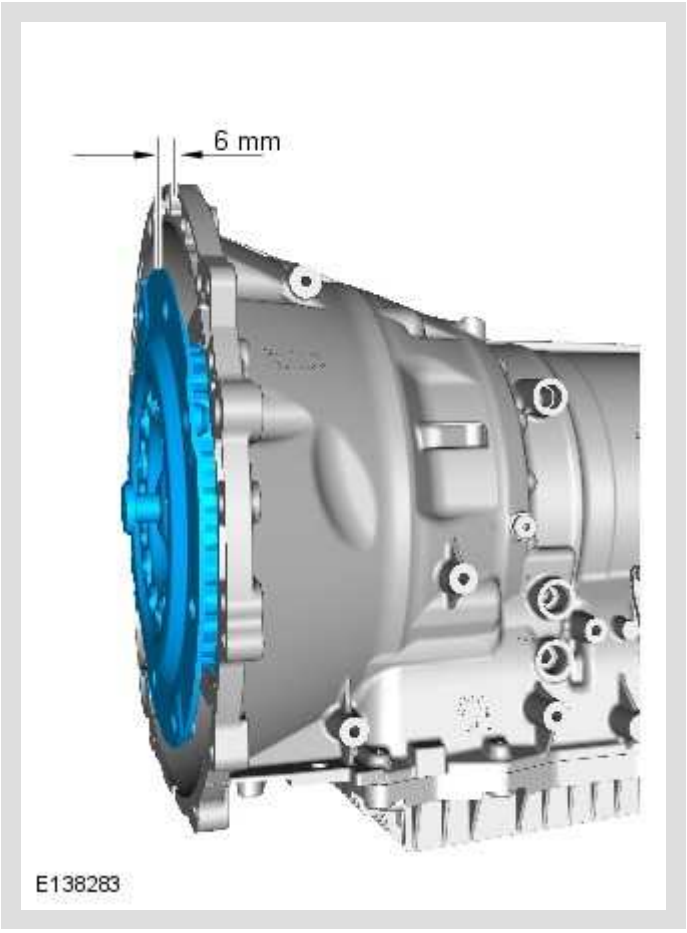


2.

NOTE:

Make sure that the torque converter is fully engaged to the transmission.

cardiagn.com

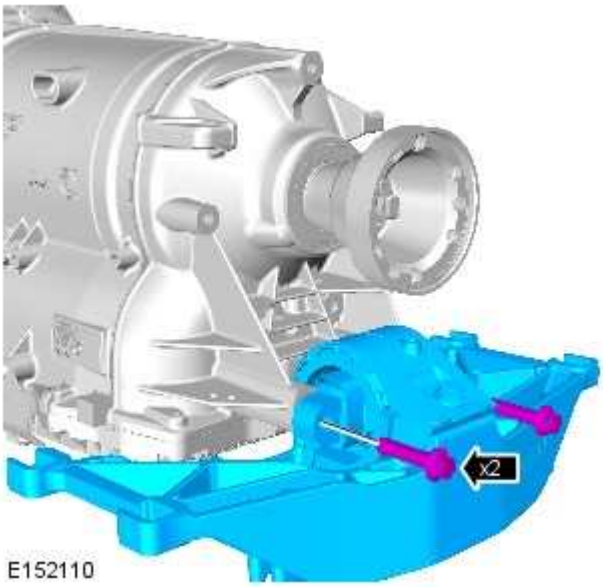


3.

△ **NOTE:**

This step is only required if previously removed.

cardiagn.com



Torque: **48 Nm**

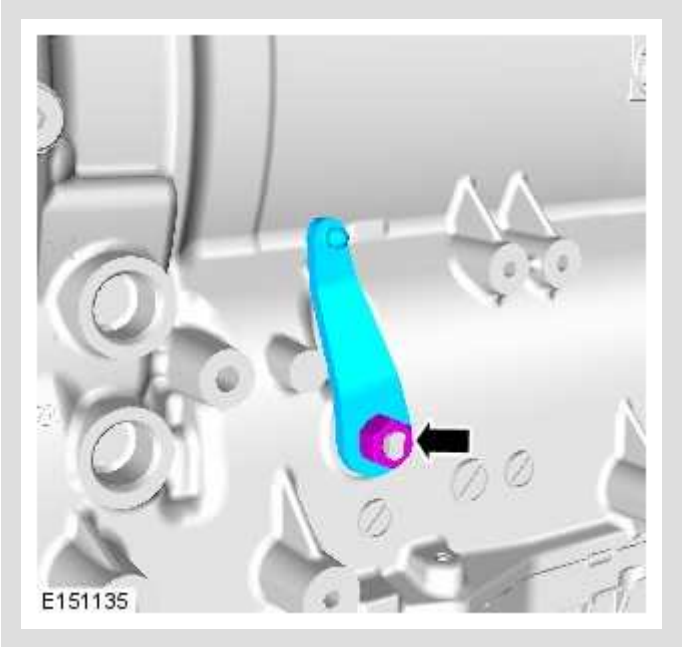
4.

5.

NOTE:

This step is only required if a new component is installed

cardiagn.com



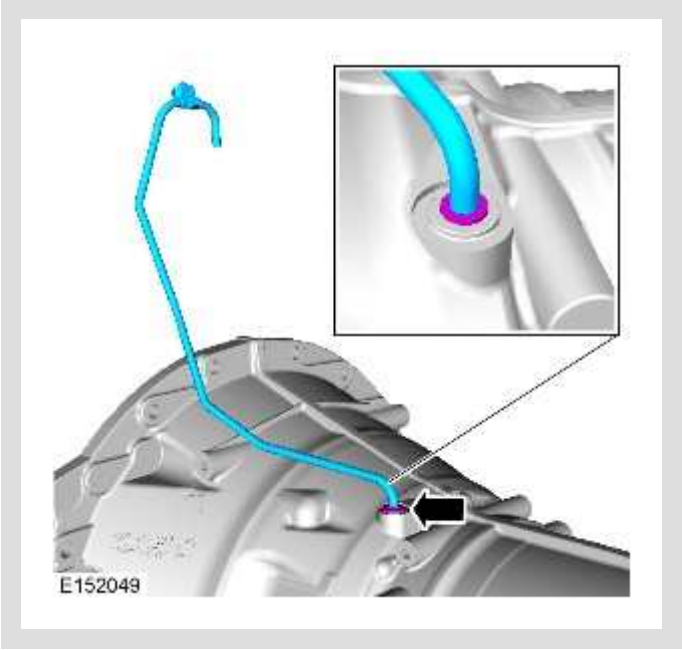
Torque: **12 Nm**

6.

CAUTION:

To prevent water ingress and subsequent transmission damage, make sure that the breather is fully pushed home into the transmission casing. The white line around the circumference of the pipe should not be visible when correctly installed.

cardiagn.com



7.

WARNINGS:

This step requires the aid of another technician.

Make sure that the transmission is secured with suitable retaining straps.

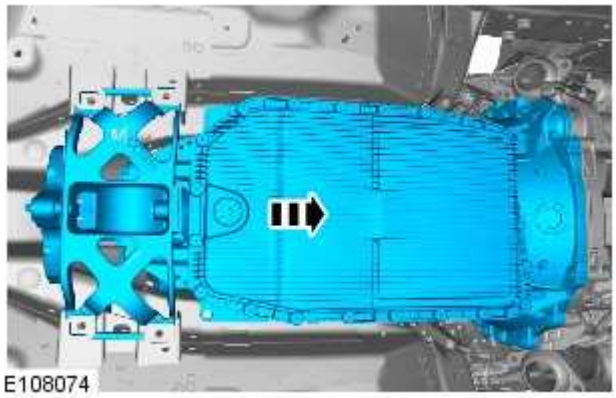
cardiagn.com

CAUTIONS:

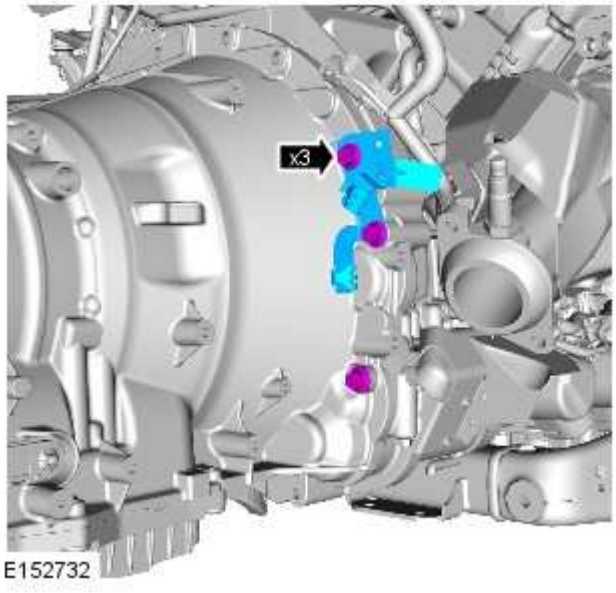
Make sure that the torque converter remains in the transmission.

Remove and discard the cable ties securing the torque converter.

Apply grease of the correct specification to the torque converter spigot.



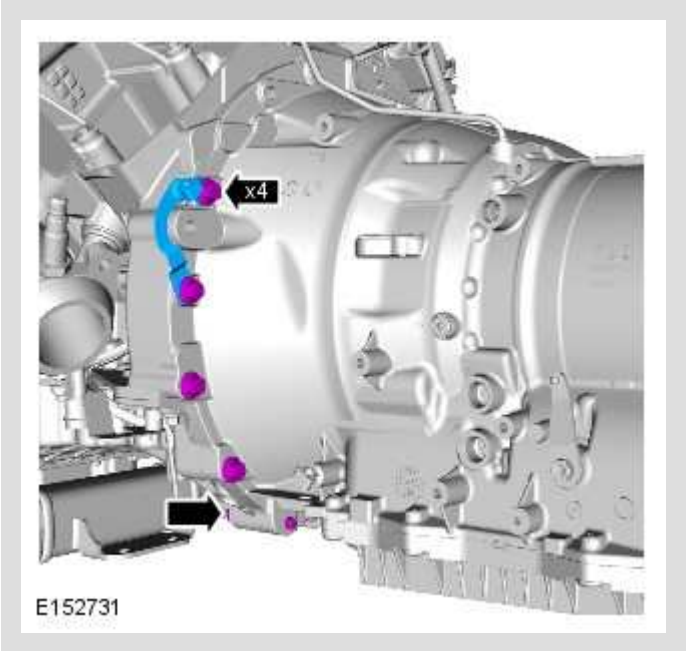
8.



Torque: **48 Nm**

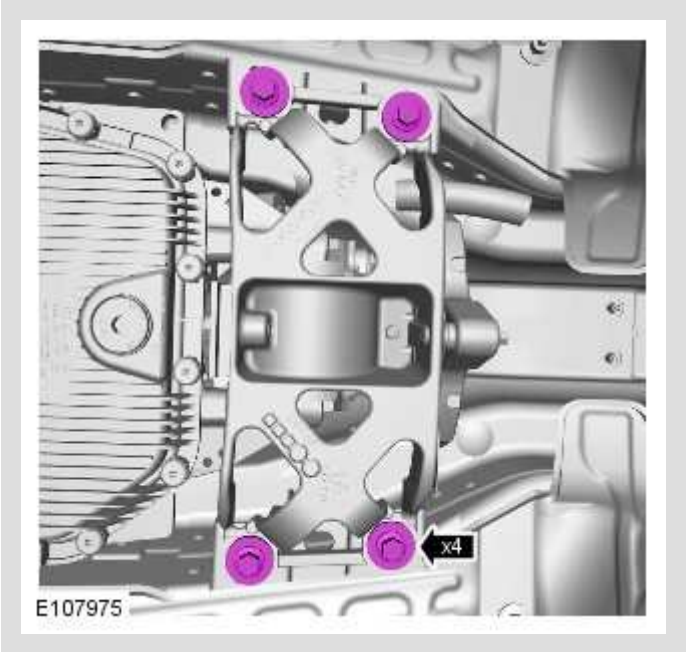
9.

cardiagn.com



Torque: **48 Nm**

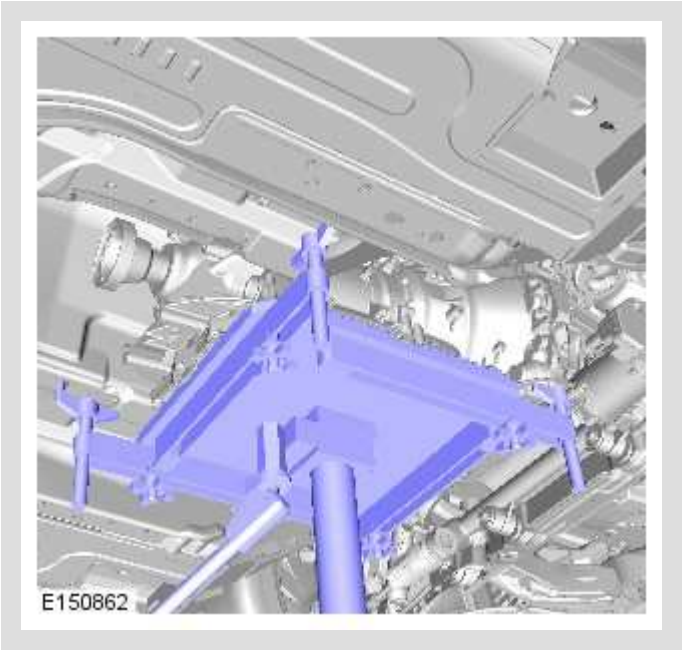
10.



Torque: **45 Nm**

11.

cardiagn.com



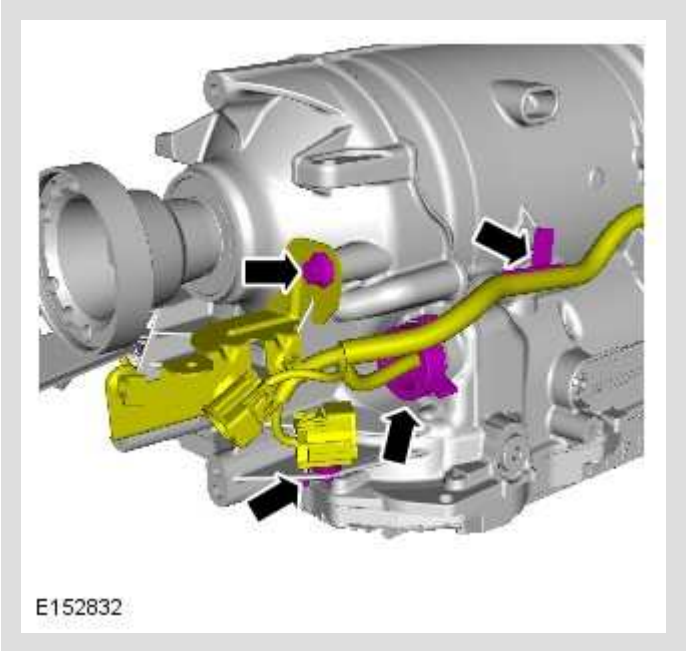
Remove the jack supporting the transmission.

12.

CAUTION:

If necessary, install new clips.

cardiagn.com



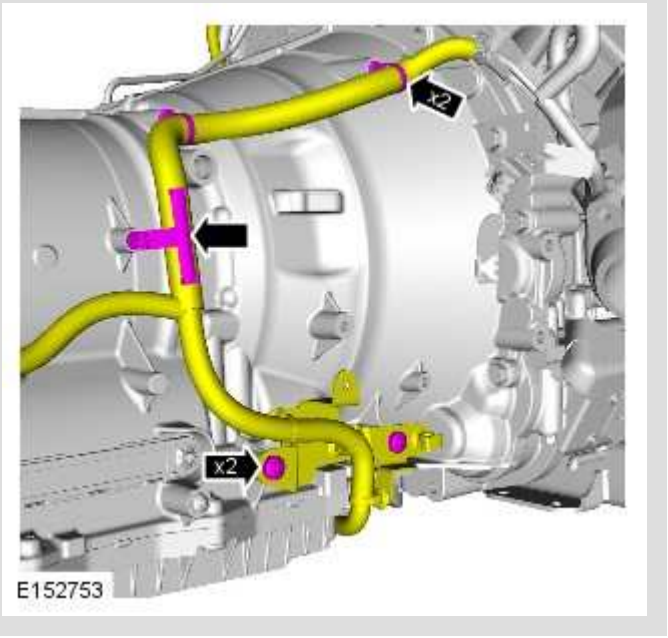
Torque: **15 Nm**

13.

CAUTION:

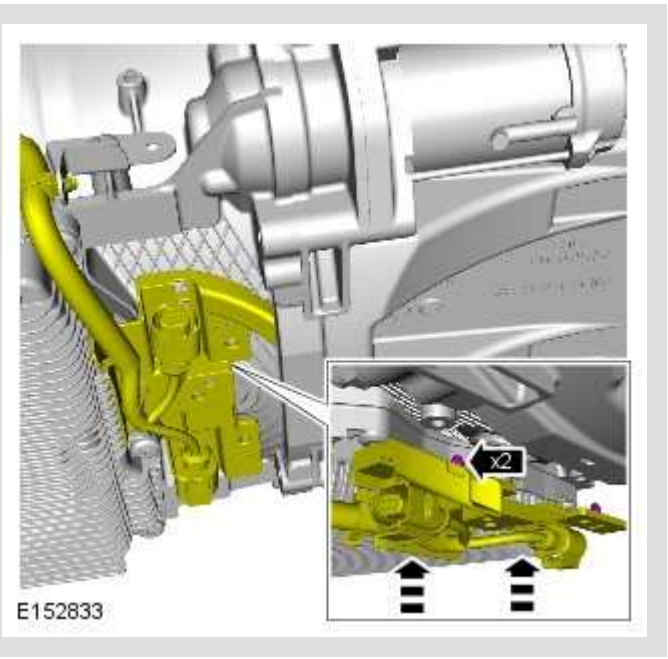
If necessary, install new clips.

cardiagn.com



Torque: **15 Nm**

14.

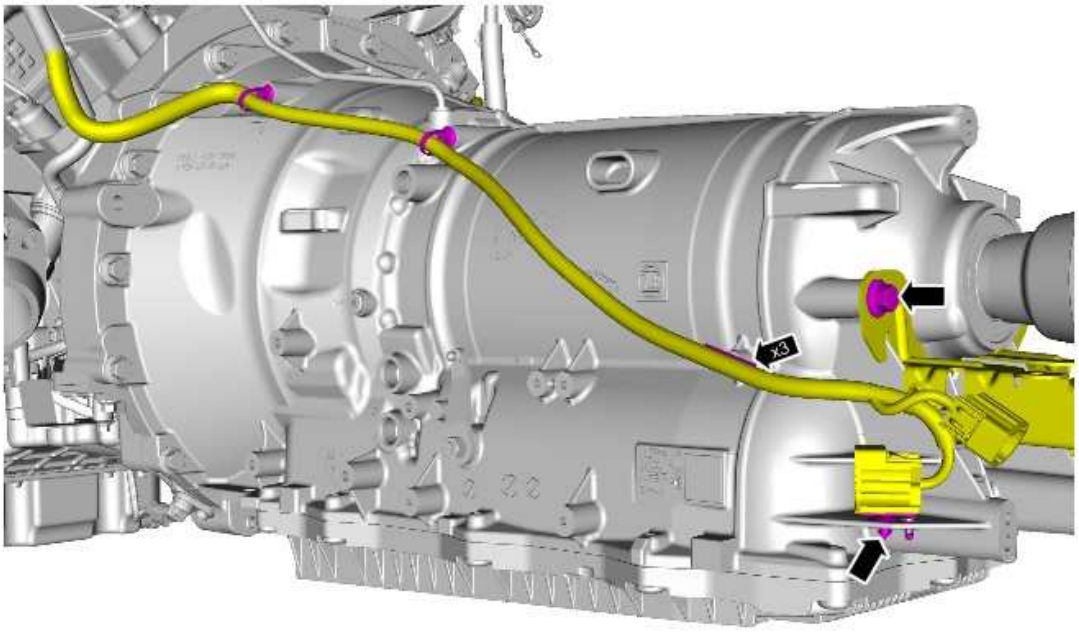


15.

cardiagn.com

CAUTION:

If necessary, install new clips.



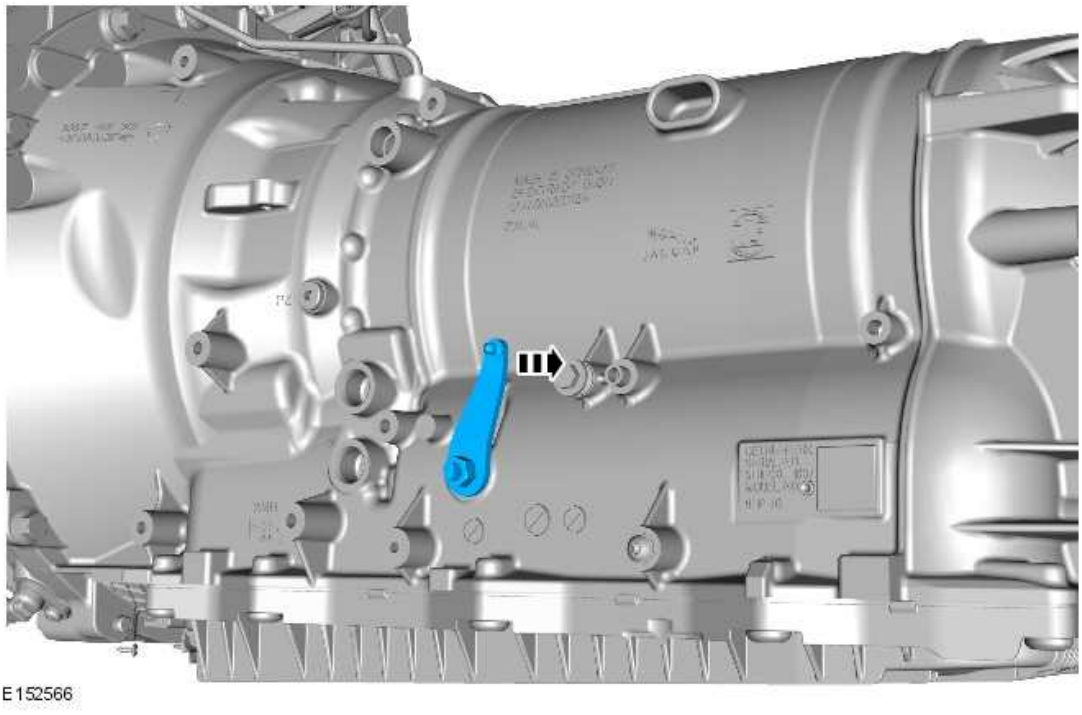
Torque: **12 Nm**

16.

CAUTION:

Secure with a cable tie.

cardiagn.com



17.

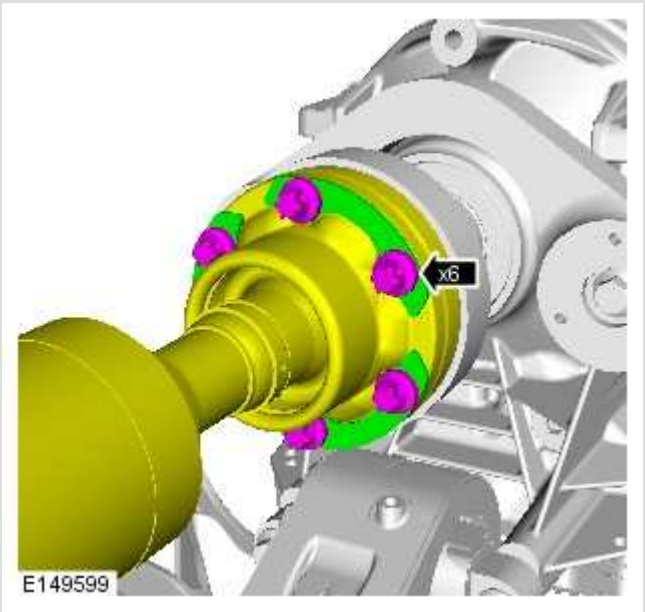
CAUTION:

Make sure that new bolts are installed.

NOTE:

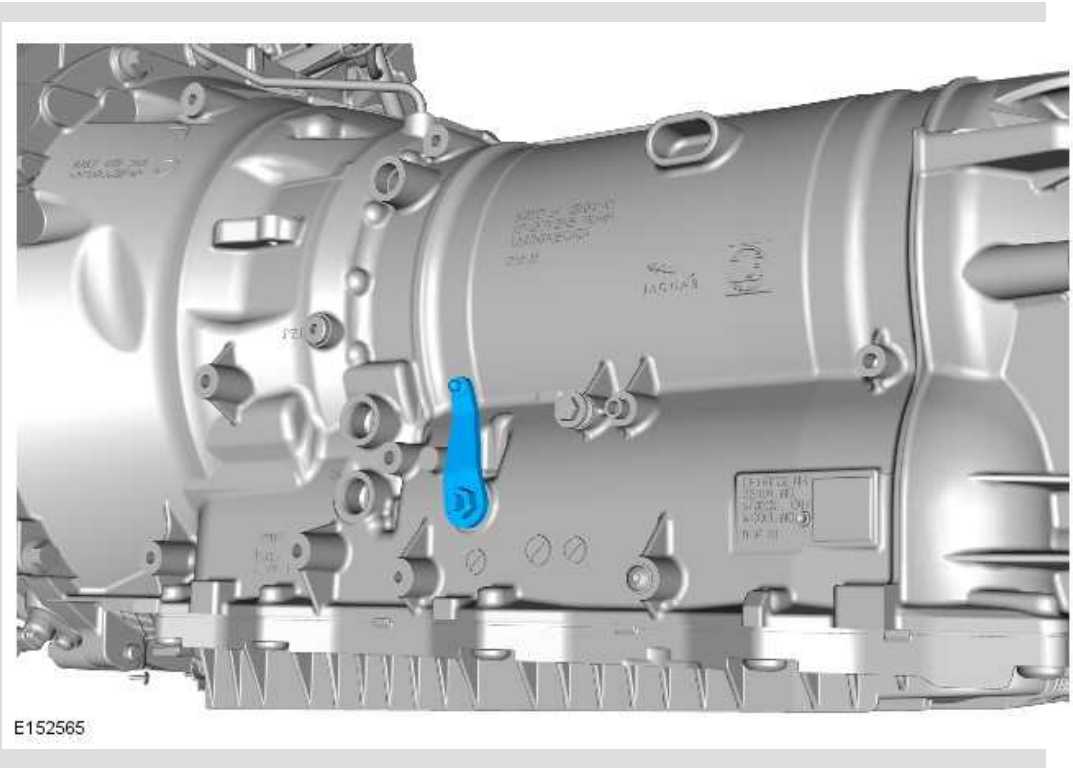
Make sure that you re-align the driveshaft to the transmission flange using the alignment mark.

cardiagn.com



Torque: **75 Nm**

18.



CAUTION:

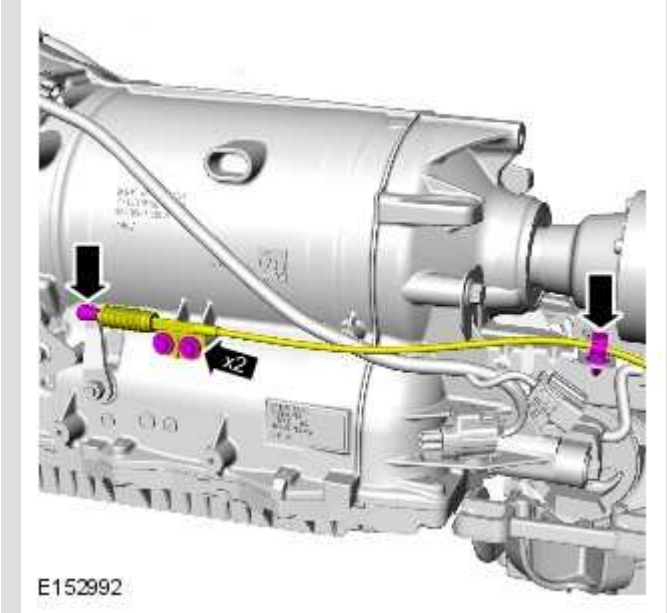
Remove the cable tie.

cardiagn.com

19.

CAUTION:

If necessary, install new clip.



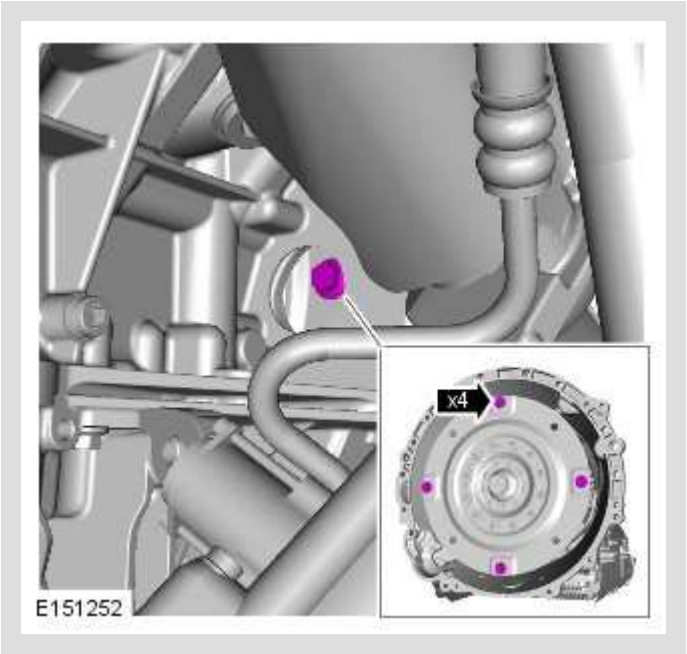
Torque: **11 Nm**

20.

CAUTIONS:

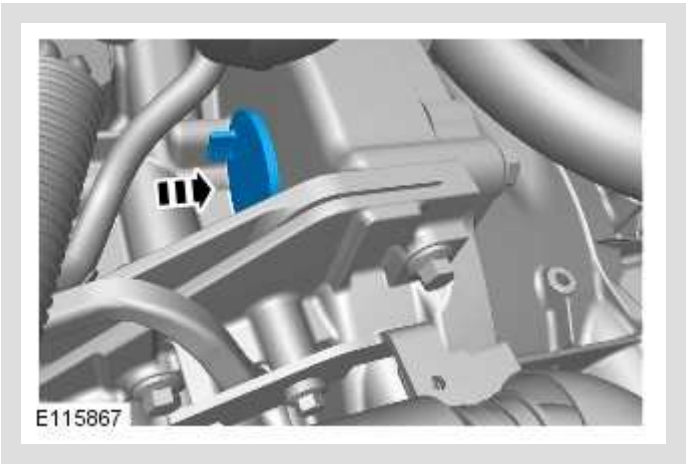
- Only rotate the crankshaft clockwise.
- Make sure that new bolts are installed.

cardiagn.com



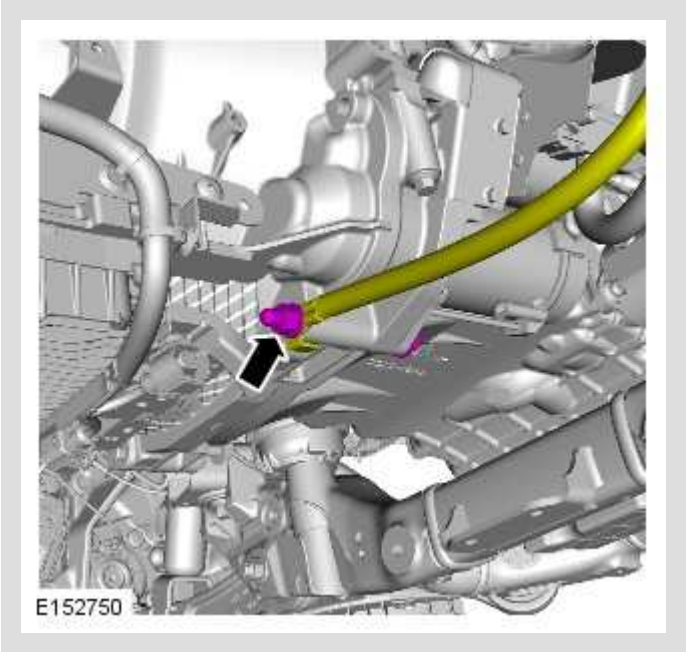
Torque: **63 Nm**

21.



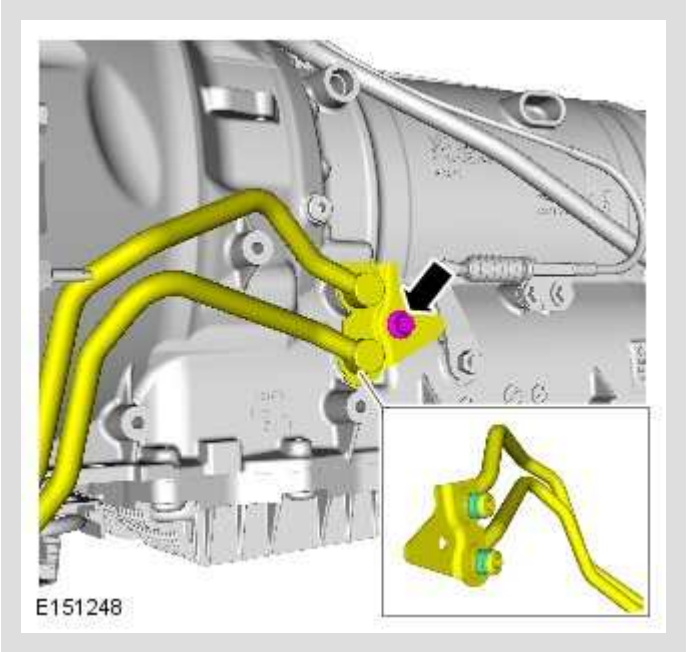
22.

cardiagn.com



Torque: **48 Nm**

23.



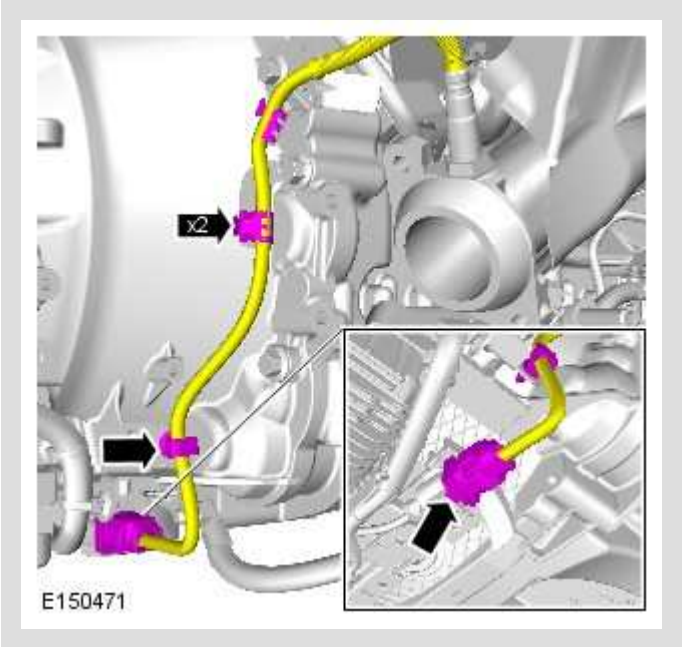
Torque: **22 Nm**

24.

CAUTION:

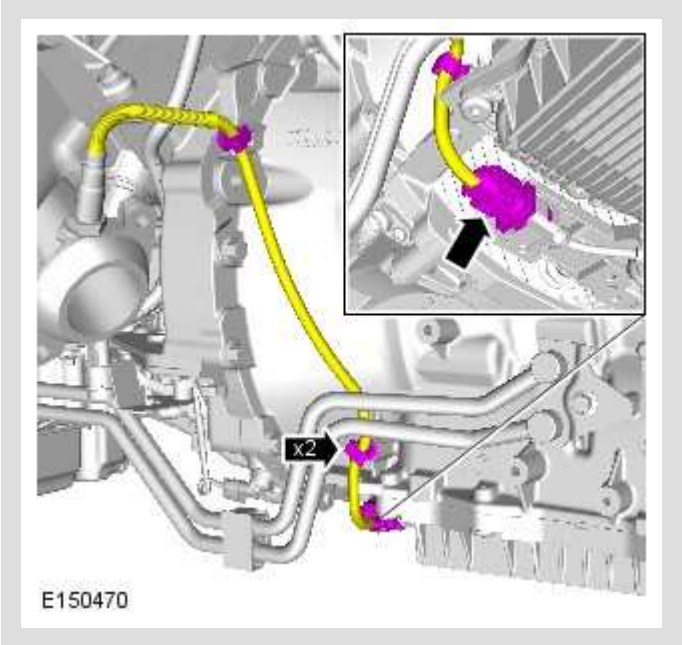
If necessary, install new clip.

cardiagn.com



25. **CAUTION:**

If necessary, install new clips.

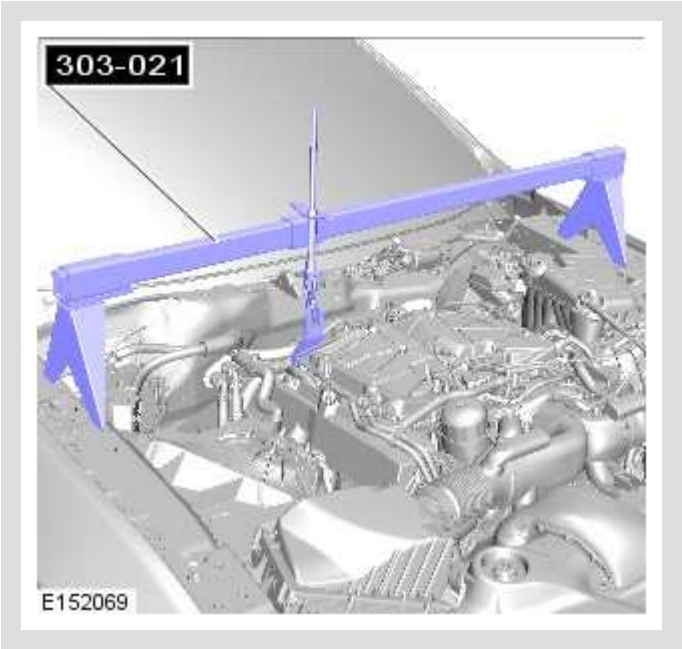


26. Refer to: Catalytic Converter LH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

cardiagn.com

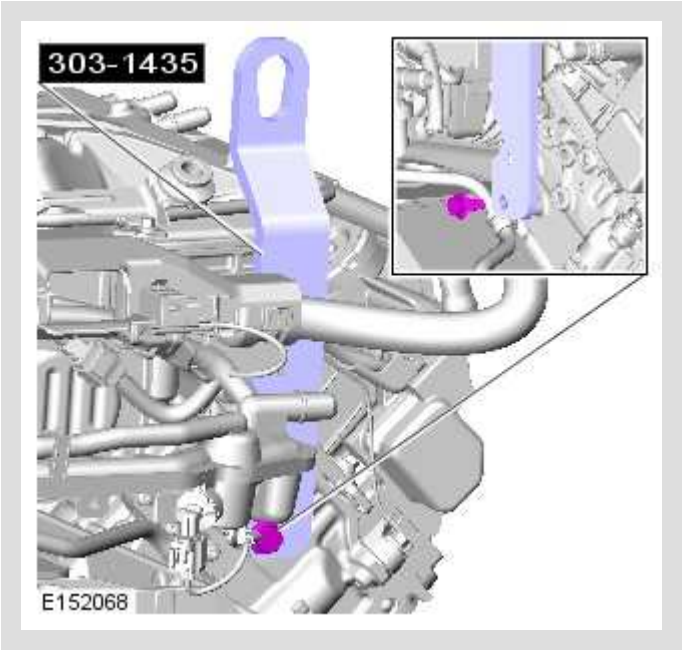
Refer to: Catalytic Converter RH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

27.



Special Tool(s): 303-021

28.



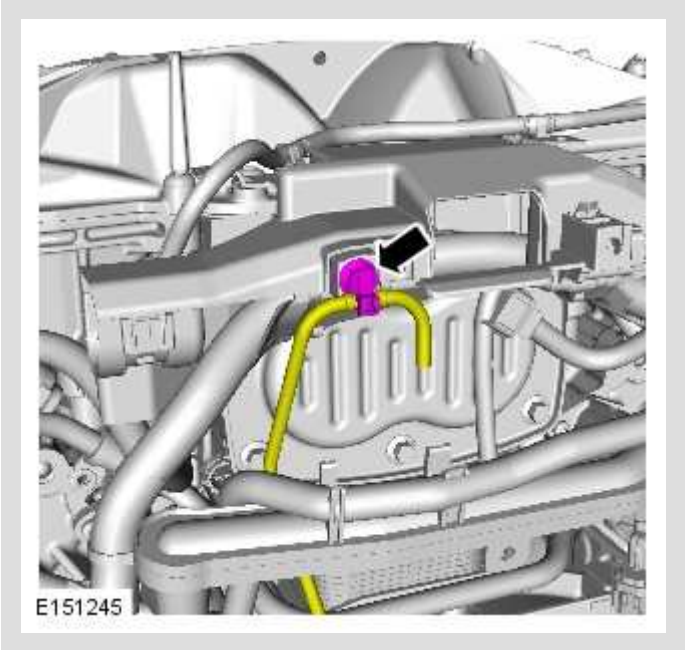
Special Tool(s): 303-1435

29.

cardiagn.com

Torque: **48 Nm**

30.



31. Refer to: Cowl Panel (501-02 Front End Body Panels, Removal and Installation).

32. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

33.

cardiagn.com

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

34. Refer to: Transmission Fluid Level Check (307-01B Automatic Transmission/Transaxle - V8 S/C 5.0L Petrol, General Procedures).

AUTOMATIC TRANSMISSION/TRANSAXLE - V6 S/C 3.0L PETROL

TRANSMISSION (G1579984)

REMOVAL

37.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	3.6	USED WITHINS	
44.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	4.9	USED WITHINS	
44.20.01.90	TRANSMISSION ASSEMBLY - REMOVE FOR ACCESS, AND INSTALL	3000 CC, AJ V6 (AJ126), 2WD	4.7	USED WITHINS	
86.75.50	FRONT SEAT TRACK MOTOR - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	

cardiagn.com

REMOVAL

SPECIAL TOOL(S)

303-021

Engine support bracket

303-1435

Engine Lifting Brackets Rear

GENERAL EQUIPMENT

EQUIPMENT NAME
Transmission jack

NOTES:

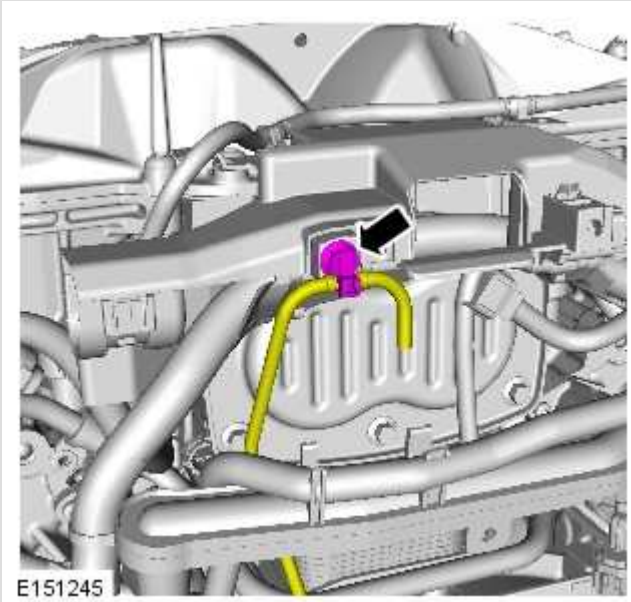
cardiagn.com

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the transmission removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

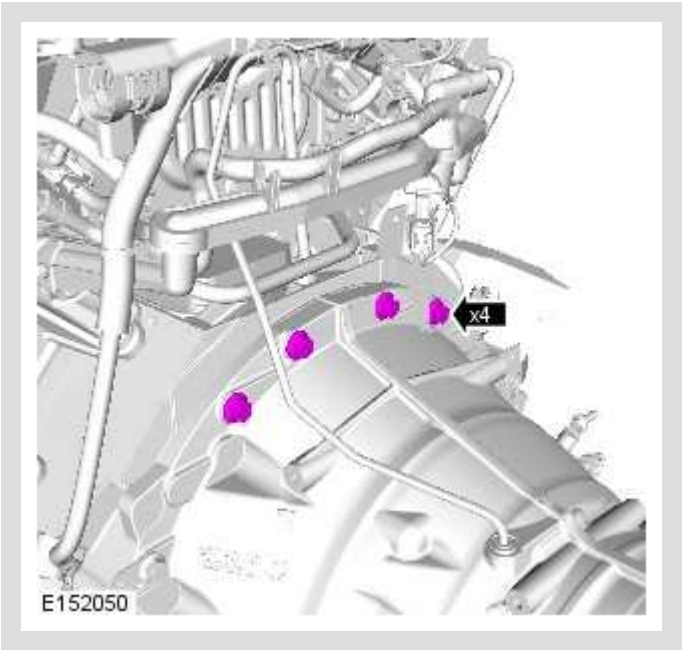
2. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

3. Refer to: Cowl Panel (501-02 Front End Body Panels, Removal and Installation).

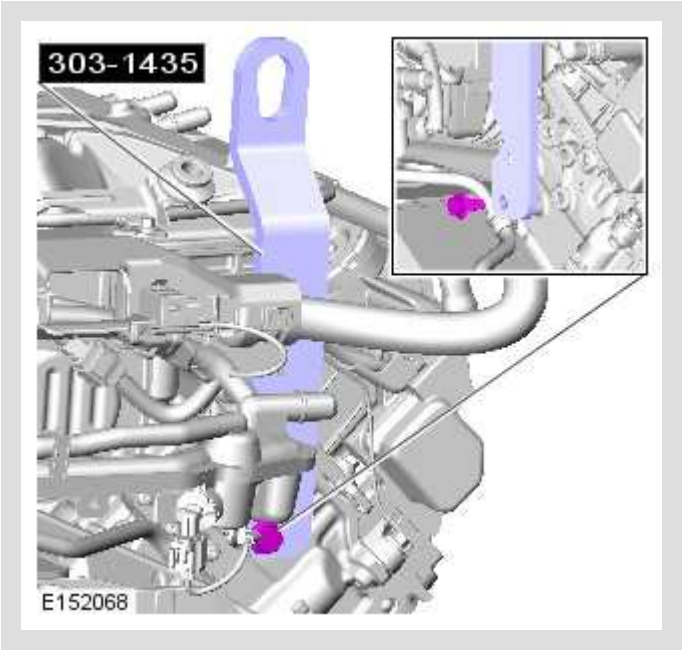
4. 

5.

cardiagn.com



6.

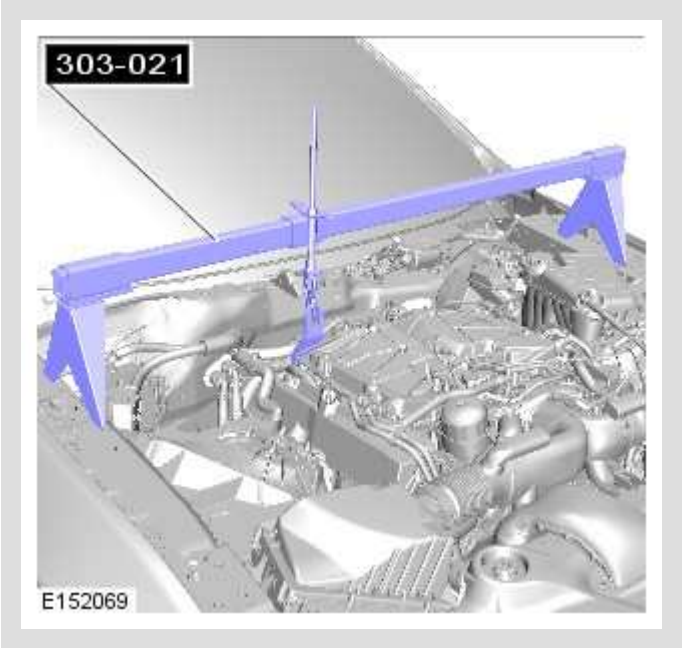


cardiagn.com

Special Tool(s): 303-1435

Torque: **25 Nm**

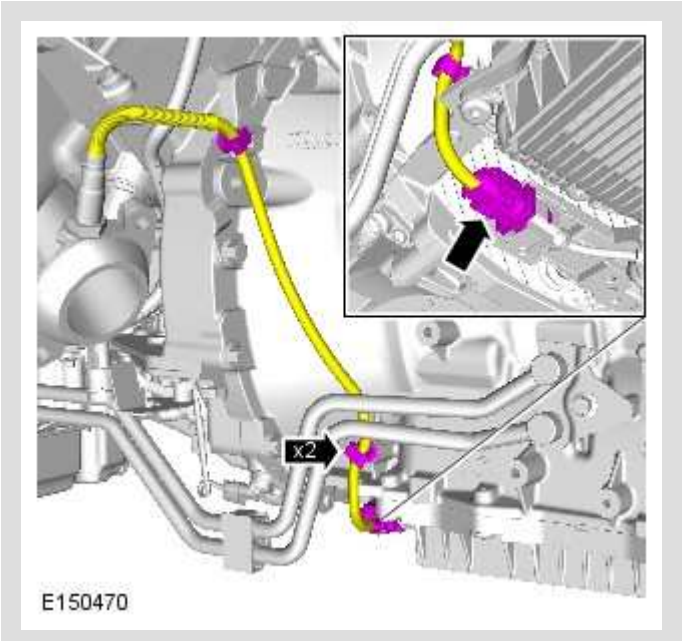
7.



Special Tool(s): 303-021

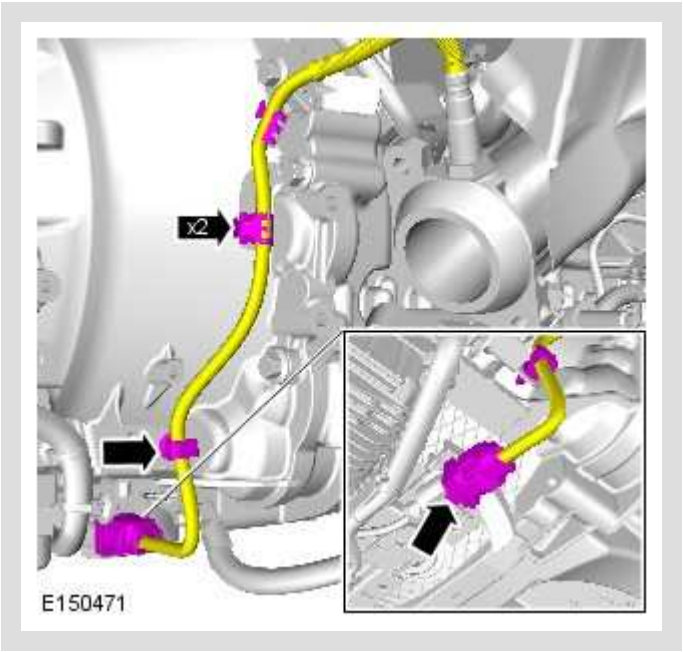
8. Refer to: Catalytic Converter LH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).
Refer to: Catalytic Converter RH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

9.

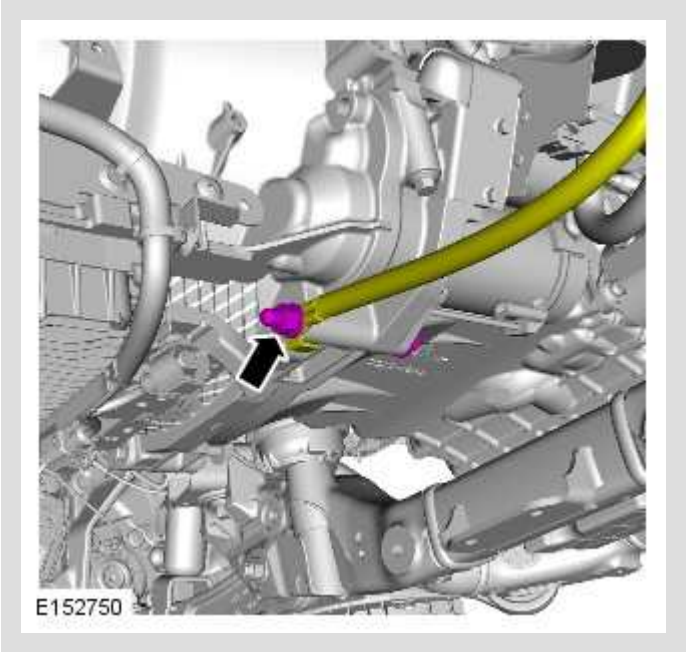


cardiagn.com

10.



11.



12.

WARNING:

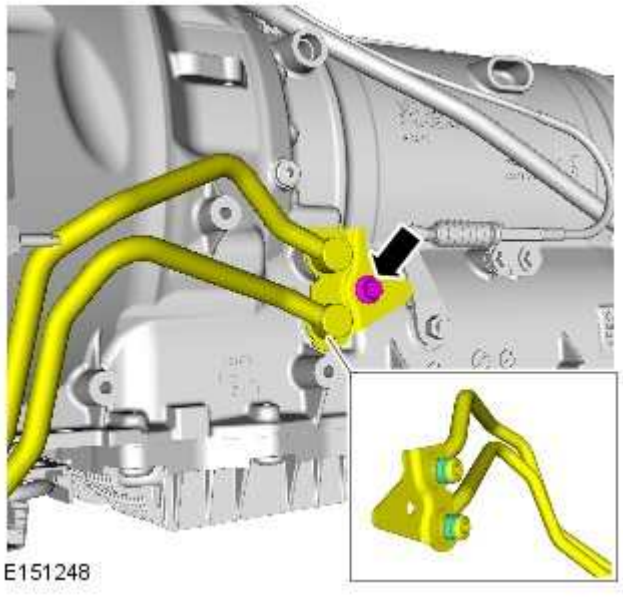
Be prepared to collect escaping fluids.

CAUTIONS:

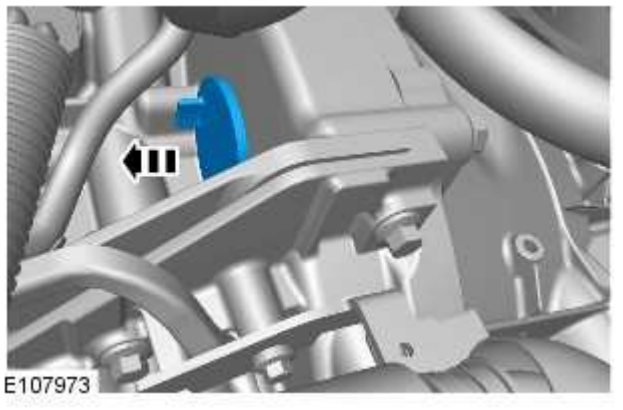
- Make sure that all openings are sealed. Use new blanking caps

cardiagn.com

- Remove and discard the O-ring seals



13.

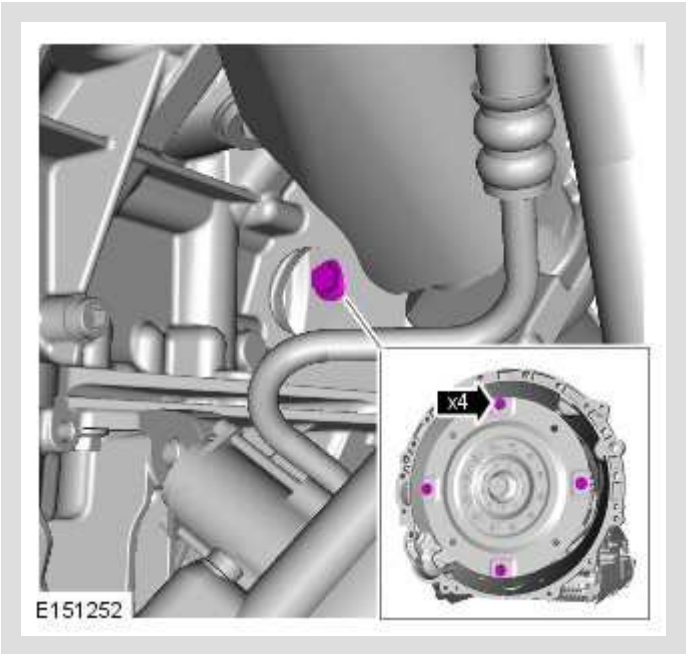


14.

CAUTIONS:

- Only rotate the crankshaft clockwise.
- Discard the bolts.

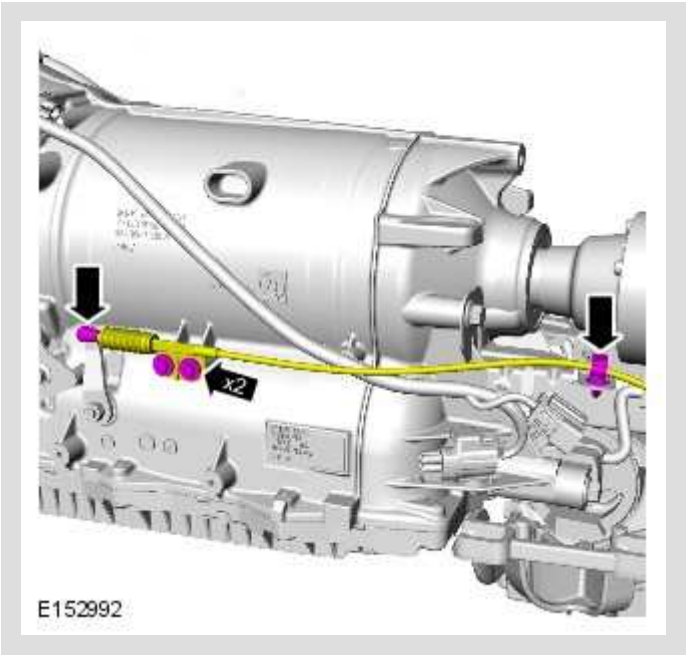
cardiagn.com



15.

CAUTION:

Secure with a cable tie.



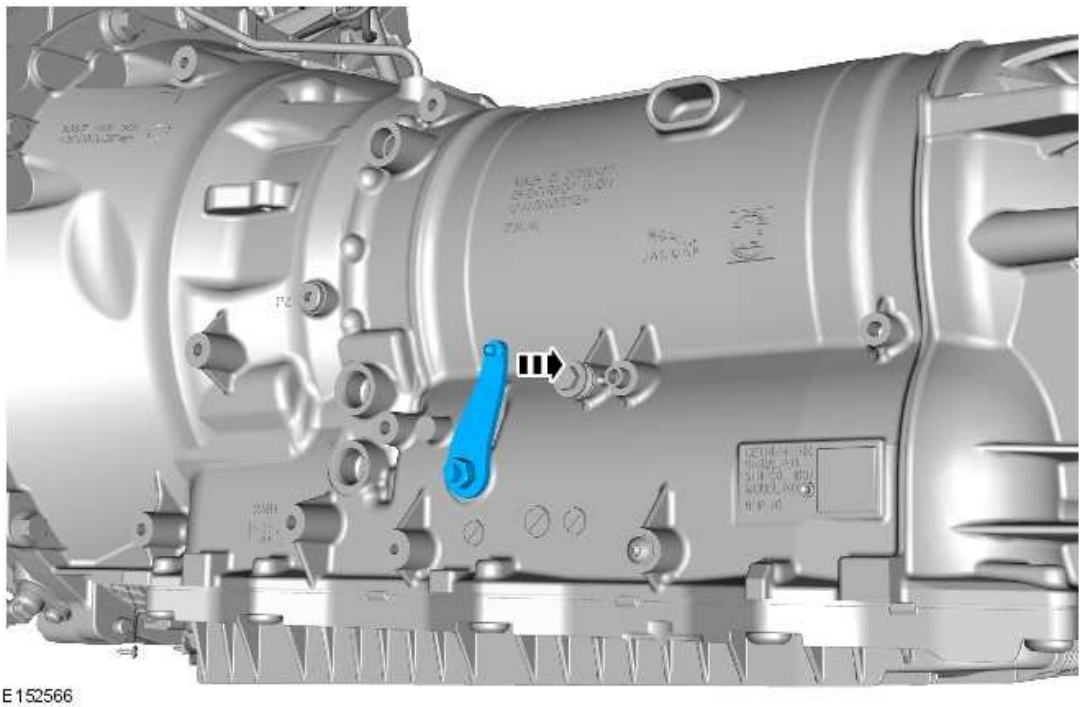
cardiagn.com

16.

CAUTIONS:

Care must be taken not to damage the component.

Secure with a cable tie.

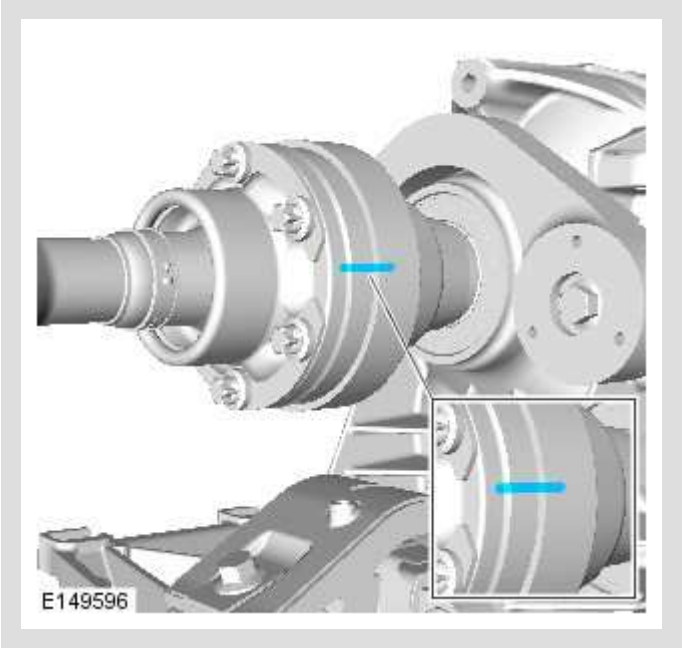


17.

NOTE:

Mark the position of the driveshaft on the transmission flange.

cardiagn.com

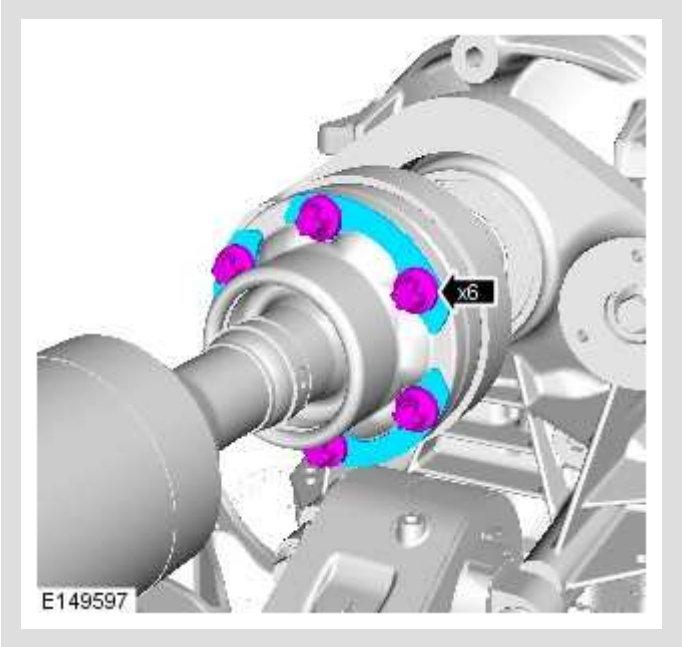


18.

CAUTION:

Discard the bolts.

cardiagn.com

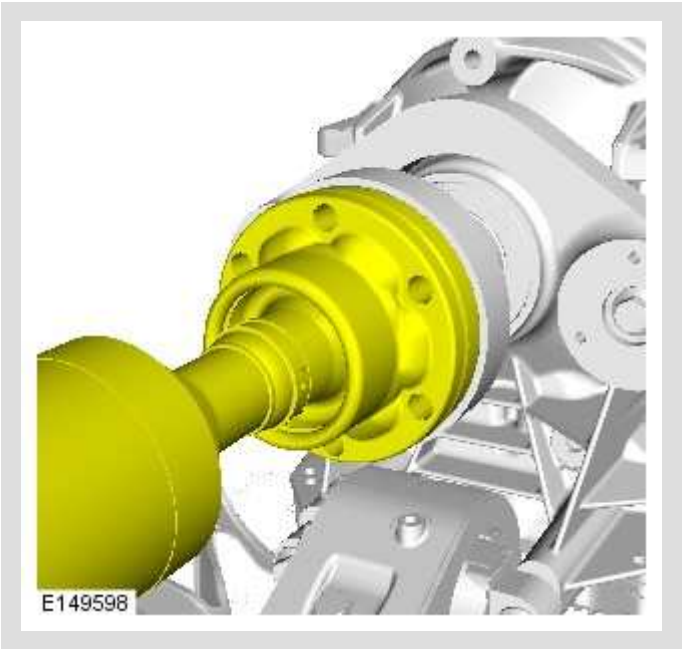


19.

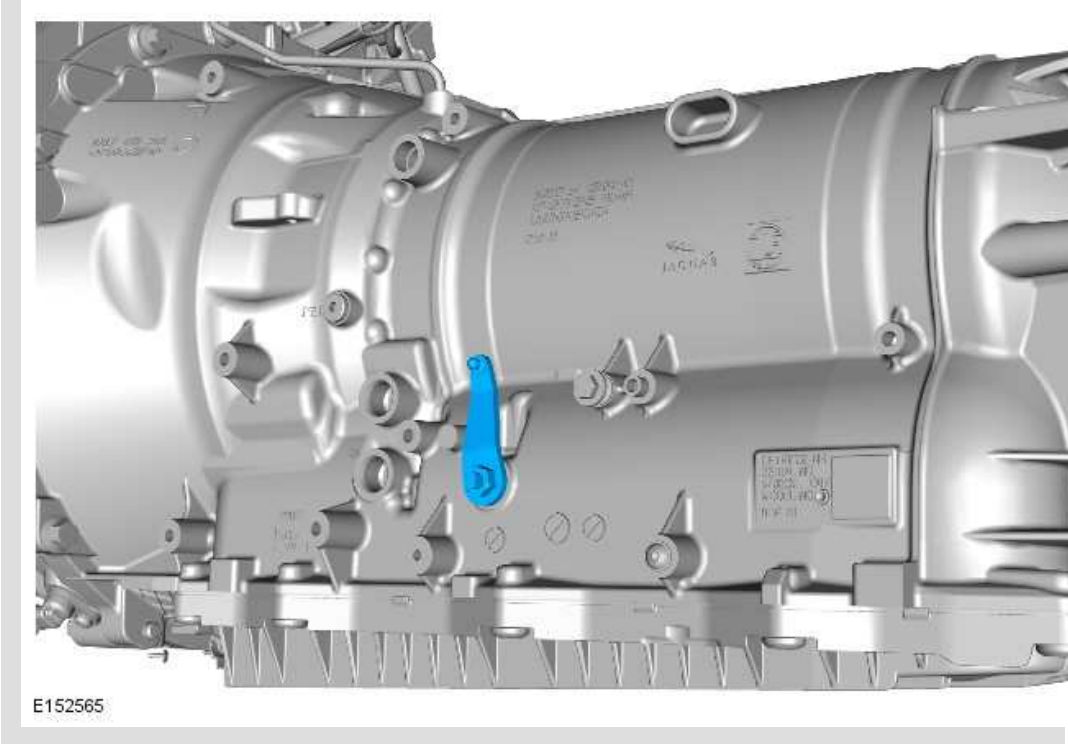
CAUTION:

Make sure that the driveshaft is supported with suitable retaining straps.

cardiagn.com



20.



CAUTION:

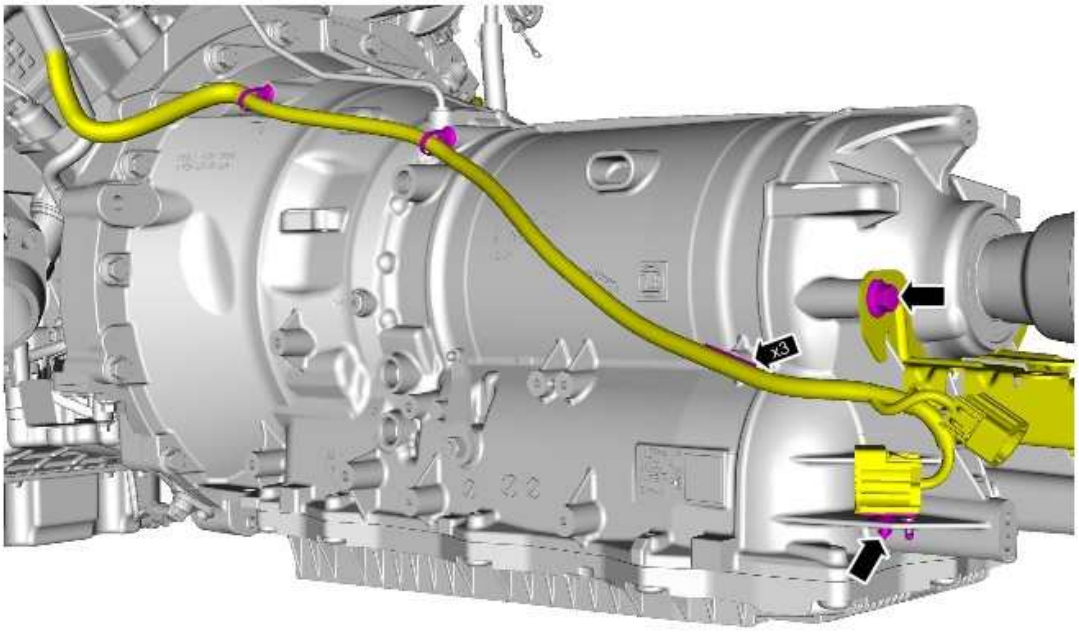
cardiagn.com

Remove the cable tie.

21.

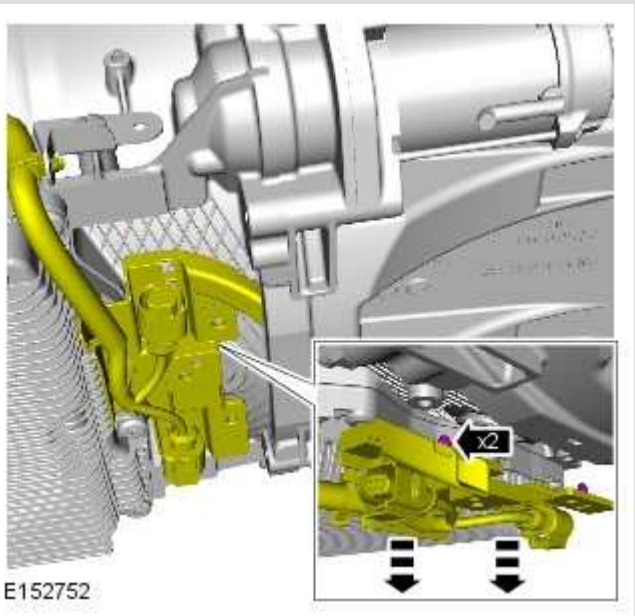
NOTE:

Secure with cable ties.



E152751

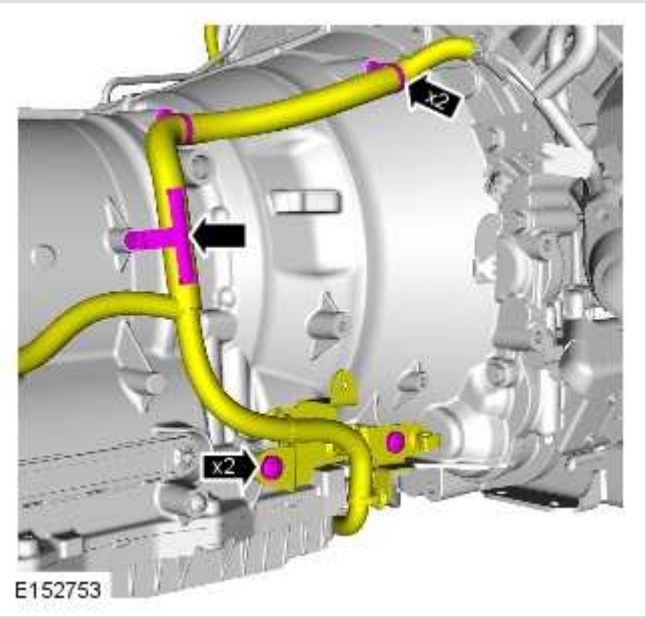
22.



E152752

cardiagn.com

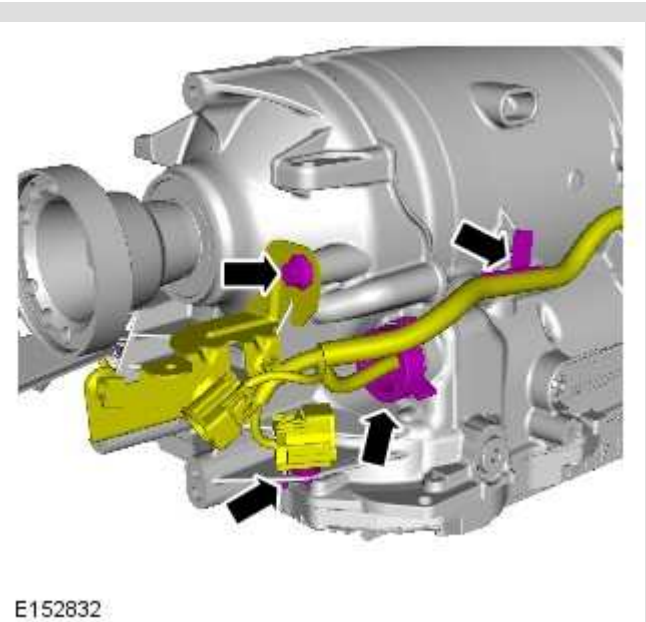
23.



24.

NOTE:

Secure with cable ties.

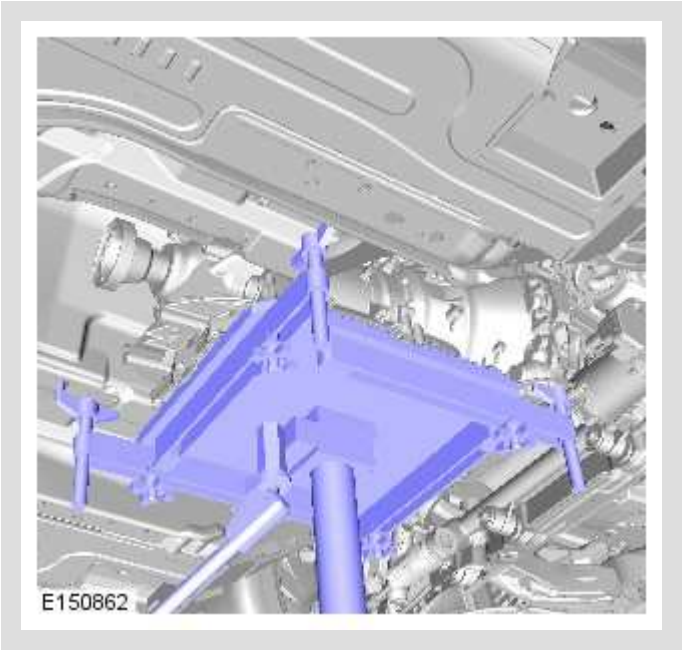


25.

WARNING:

cardiagn.com

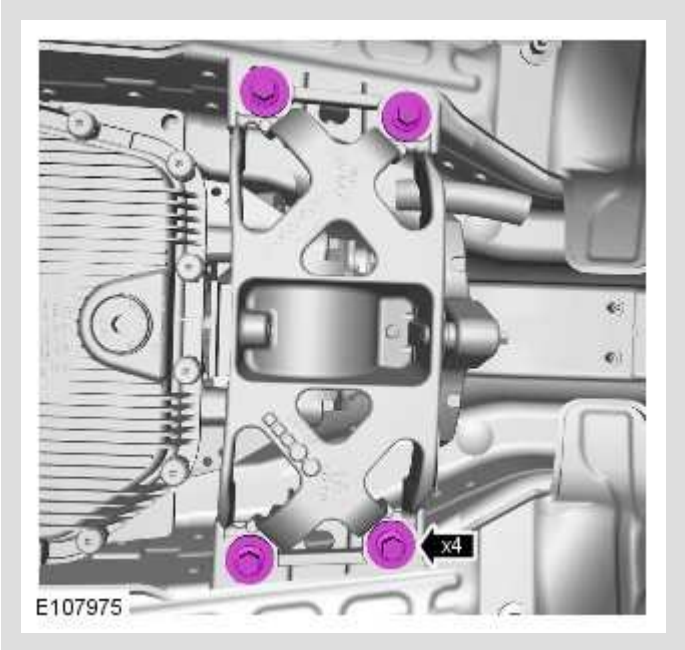
Make sure that the transmission is secured with suitable retaining straps.



Using a suitable stand, support the transmission.

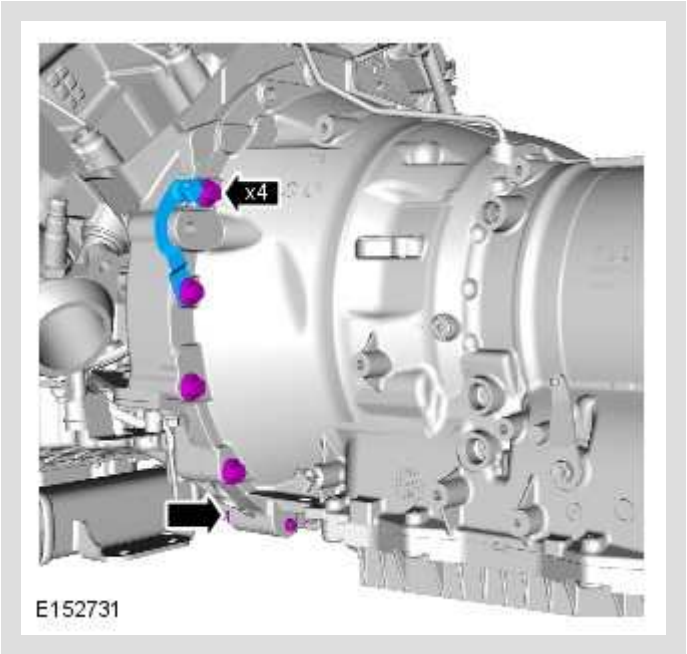
General Equipment: Transmission jack

26.

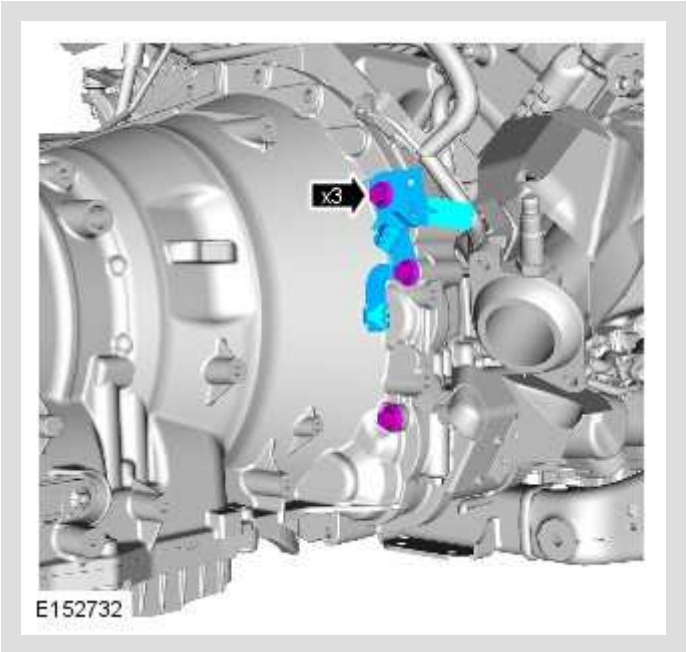


27.

cardiagn.com



28.



29.

WARNING:

This step requires the aid of another technician.

cardiagn.com

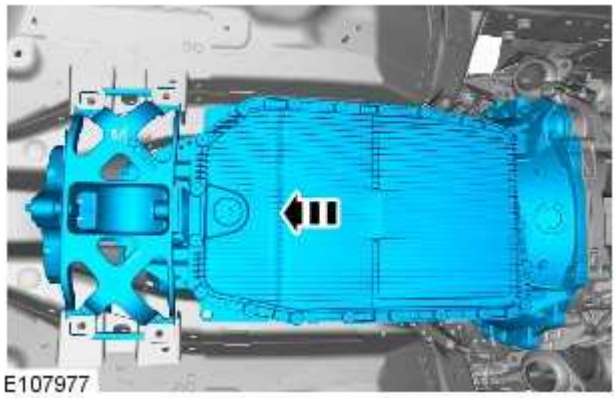
CAUTIONS:

Care must be taken to avoid damaging the surrounding components.

Make sure that the torque converter remains in the transmission.

NOTE:

Secure the torque converter to the transmission using suitable cable ties.

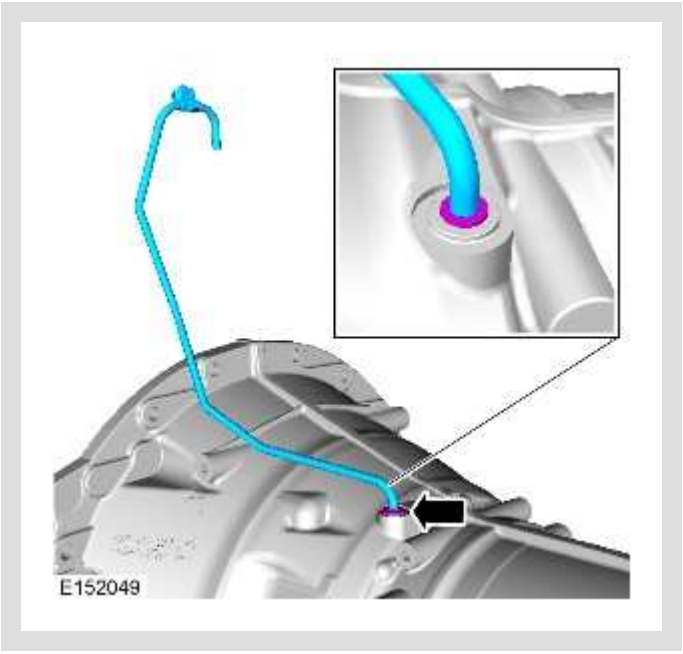


30.

CAUTION:

Always plug any open connections to prevent contamination.

cardiagn.com

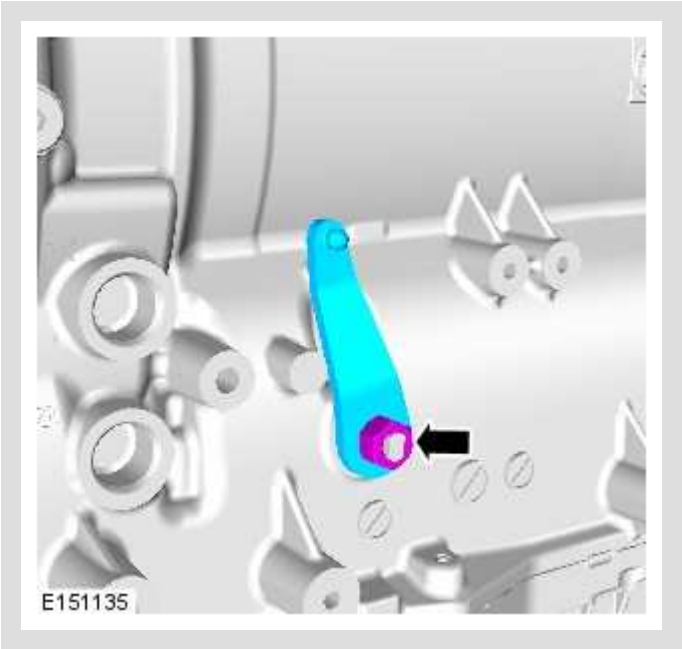


31.

NOTE:

Do not disassemble further if the component is removed for access only.

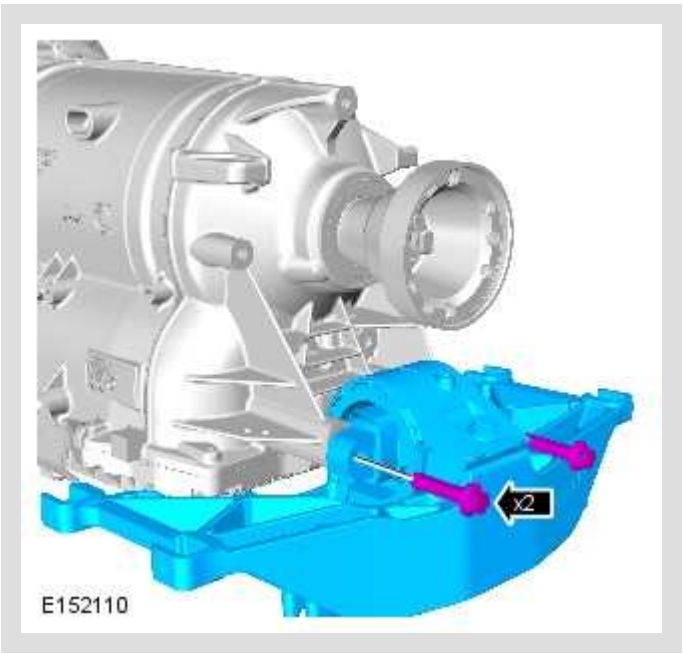
cardiagn.com



32.

cardiagn.com

33.



cardiagn.com

TRANSMISSION (G1579984)

REMOVAL

37.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	3.6	USED WITHINS	
44.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	4.9	USED WITHINS	
44.20.01.90	TRANSMISSION ASSEMBLY - REMOVE FOR ACCESS, AND INSTALL	3000 CC, AJ V6 (AJ126), 2WD	4.7	USED WITHINS	
86.75.50	FRONT SEAT TRACK MOTOR - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	

REMOVAL

SPECIAL TOOL(S)

303-021

Engine support bracket

cardiagn.com

303-1435

Engine Lifting Brackets Rear

GENERAL EQUIPMENT

EQUIPMENT NAME
Transmission jack

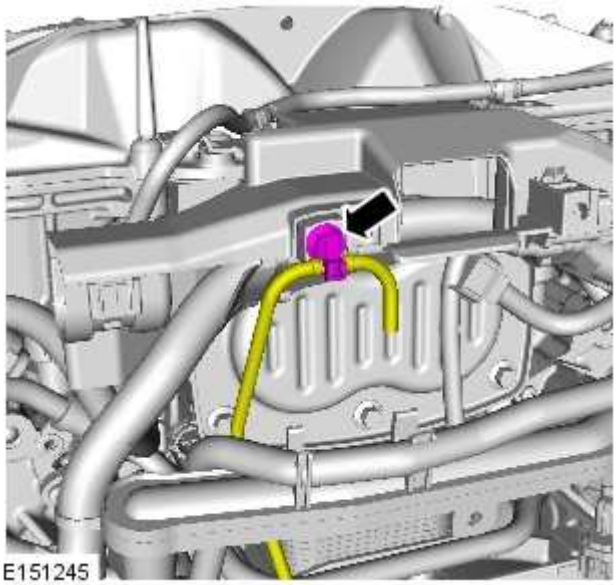
NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the transmission removed for clarity.

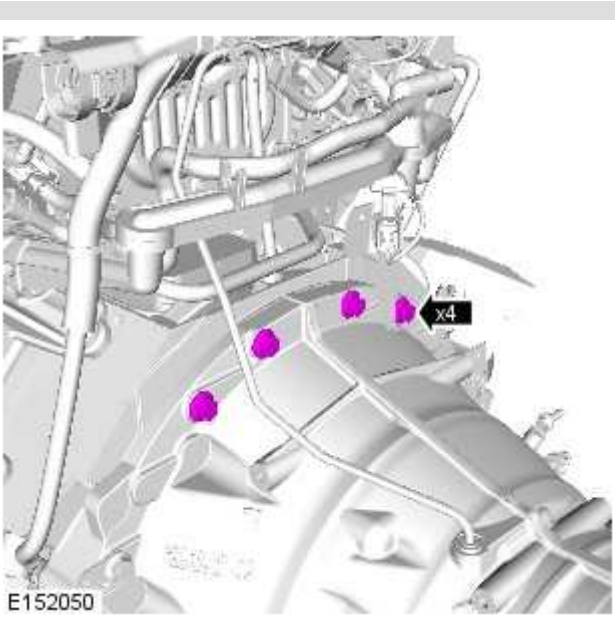
1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
2. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).
3. Refer to: Cowl Panel (501-02 Front End Body Panels, Removal and Installation).

cardiagn.com

4.

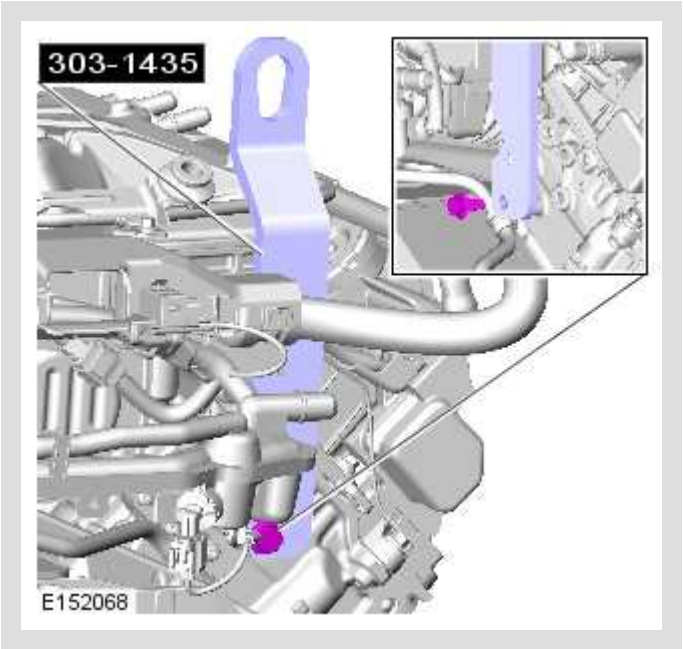


5.



6.

cardiagn.com

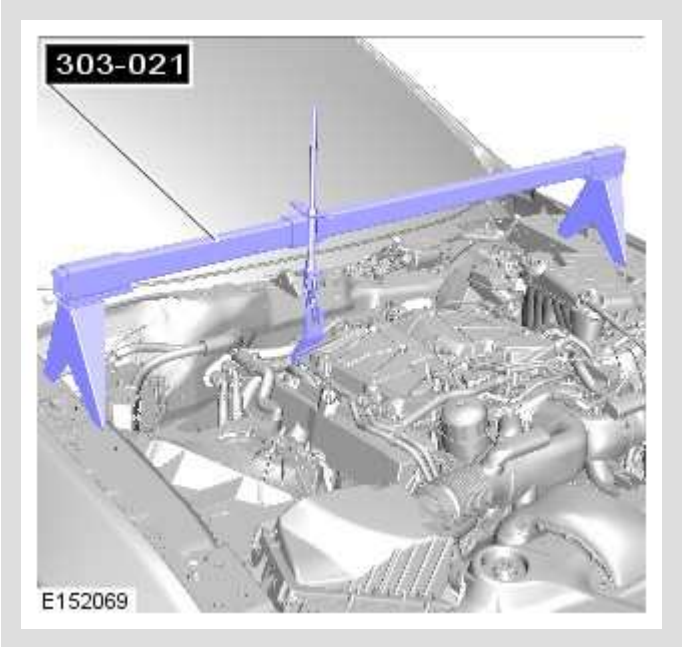


Special Tool(s): 303-1435

Torque: **25 Nm**

7.

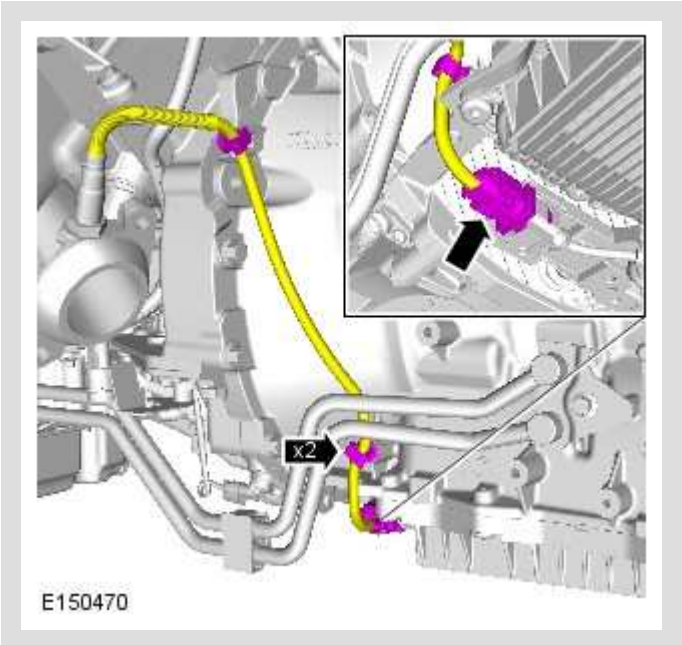
cardiagn.com



Special Tool(s): 303-021

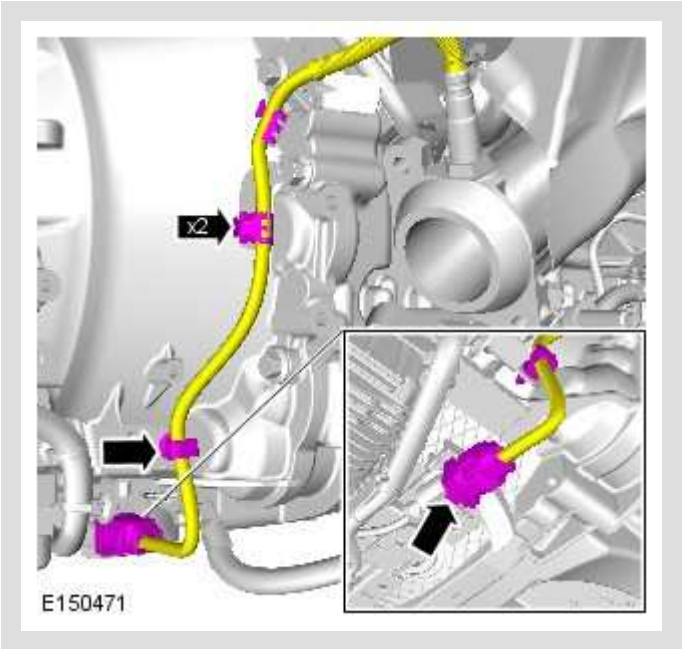
8. Refer to: Catalytic Converter LH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).
Refer to: Catalytic Converter RH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

9.

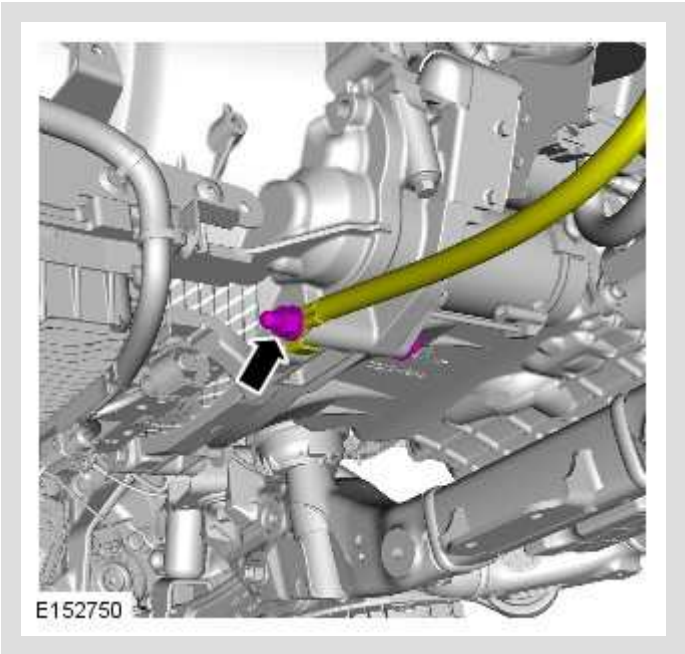


10.

cardiagn.com



11.



12.

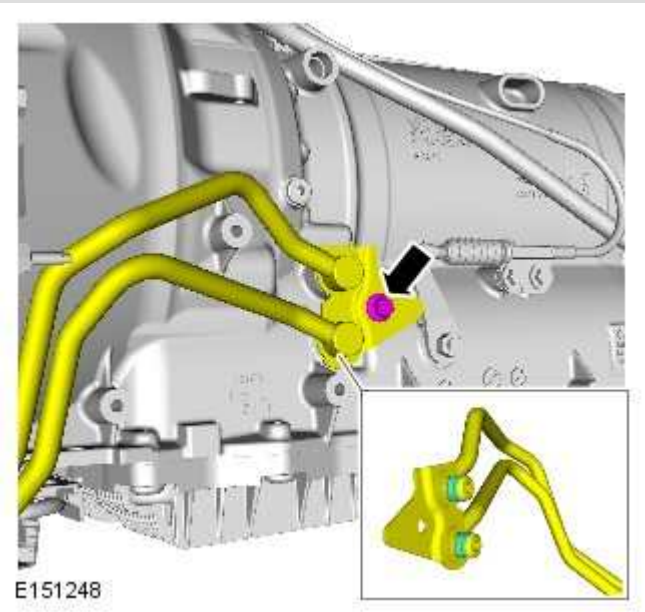
⚠ WARNING:

Be prepared to collect escaping fluids.

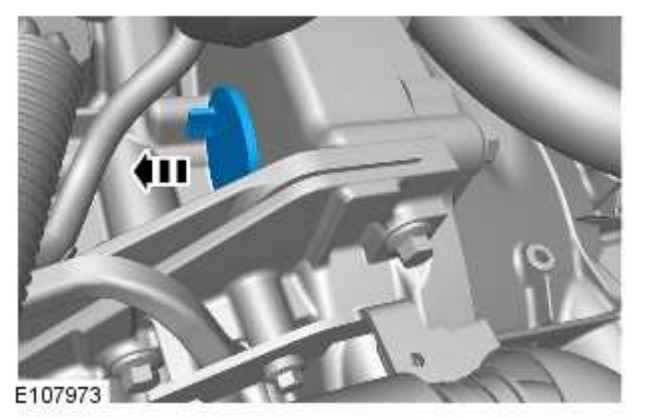
cardiagn.com

CAUTIONS:

- Make sure that all openings are sealed. Use new blanking caps
- Remove and discard the O-ring seals



13.

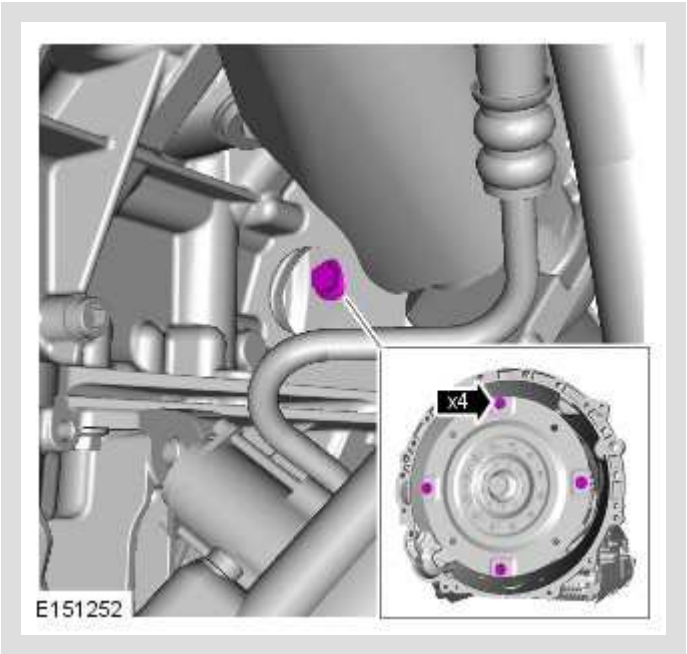


14.

CAUTIONS:

- Only rotate the crankshaft clockwise.
- Discard the bolts.

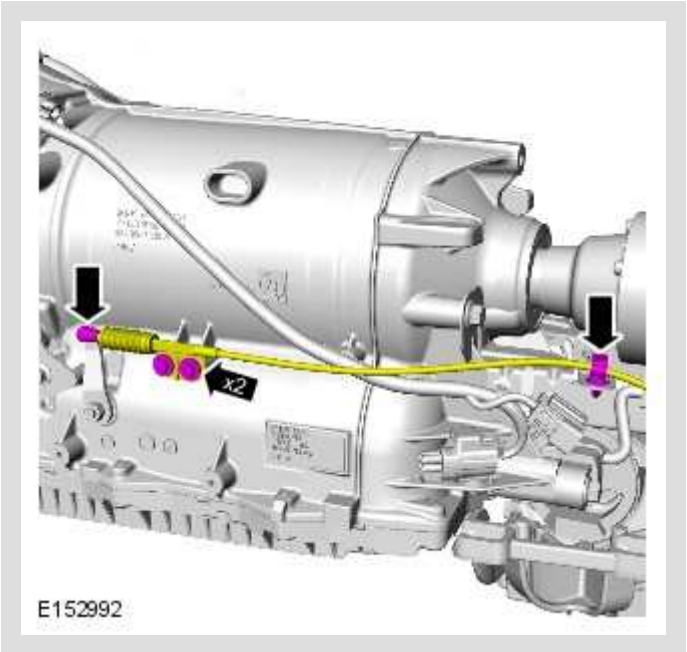
cardiagn.com



15.

CAUTION:

Secure with a cable tie.



16.

CAUTIONS:

cardiagn.com

Care must be taken not to damage the component.

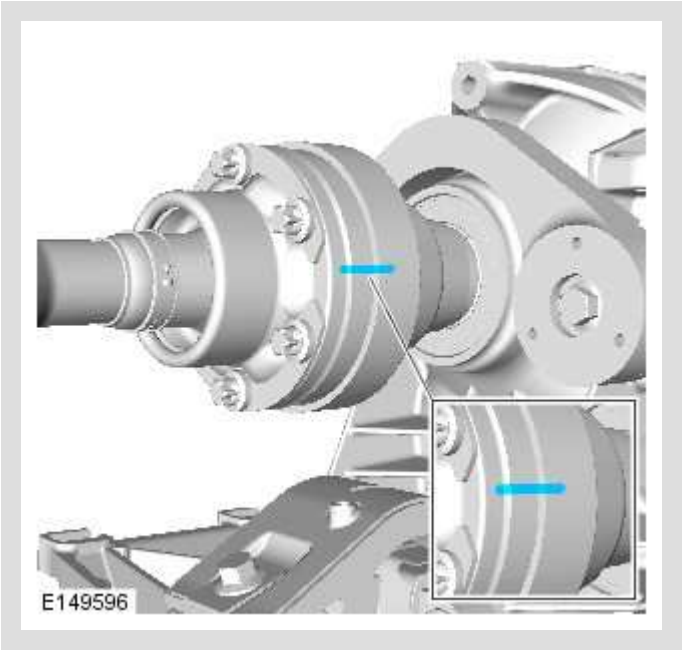
Secure with a cable tie.

17.

NOTE:

Mark the position of the driveshaft on the transmission flange.

cardiagn.com

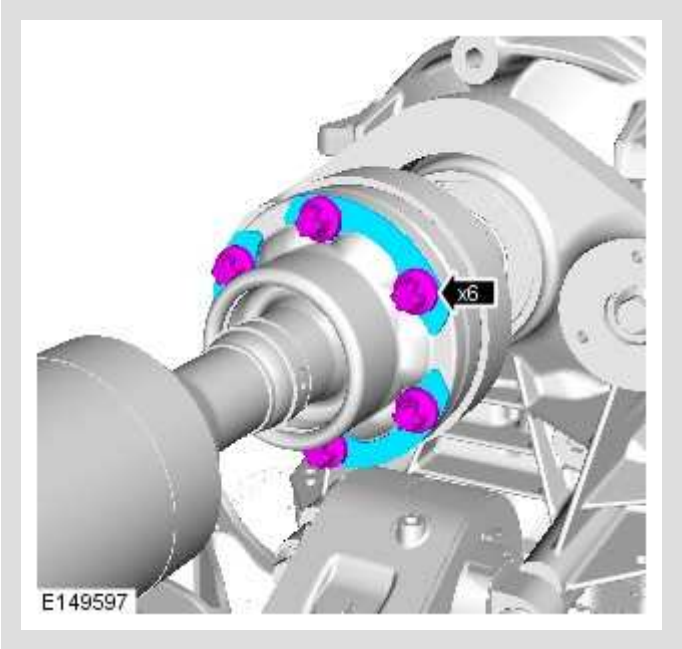


18.

CAUTION:

Discard the bolts.

cardiagn.com



19.

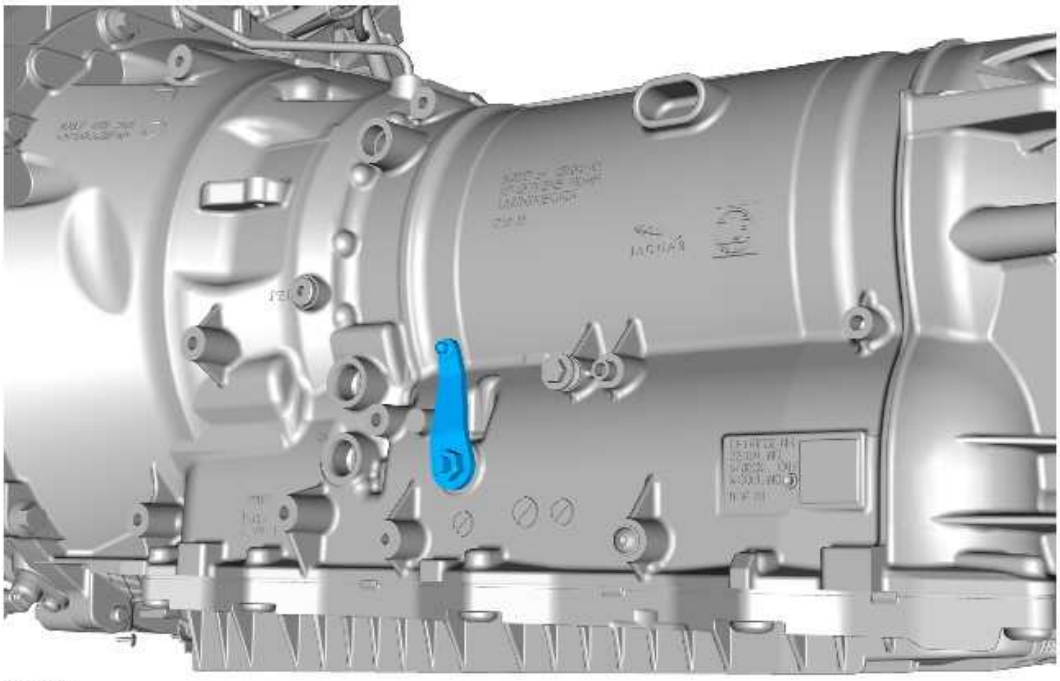
CAUTION:

Make sure that the driveshaft is supported with suitable retaining straps.

cardiagn.com

20.

cardiagn.com


E152565

CAUTION:

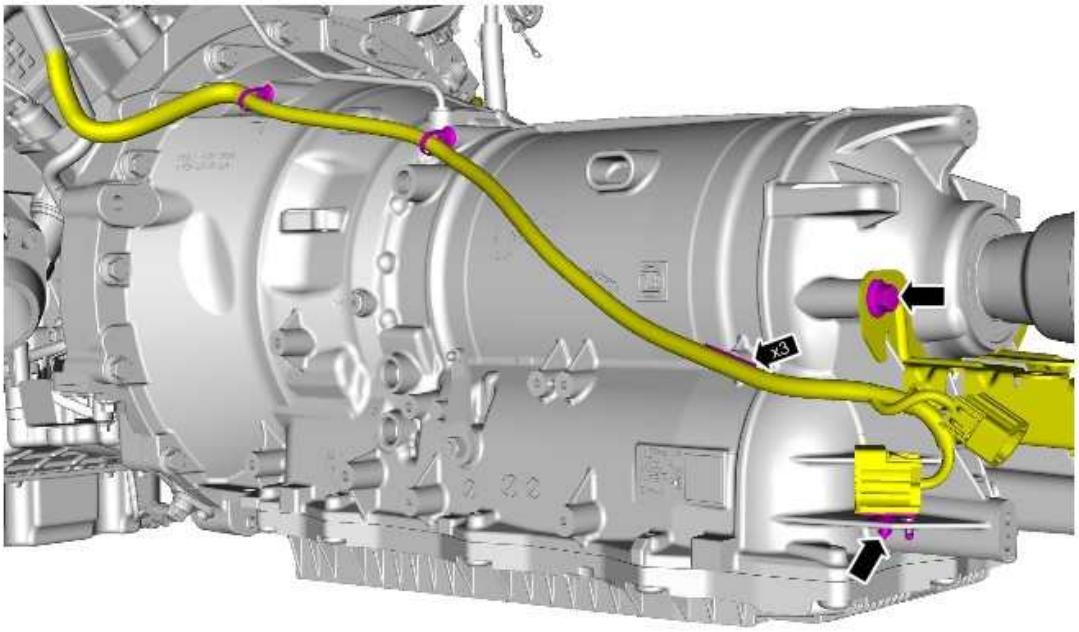
Remove the cable tie.

21.

NOTE:

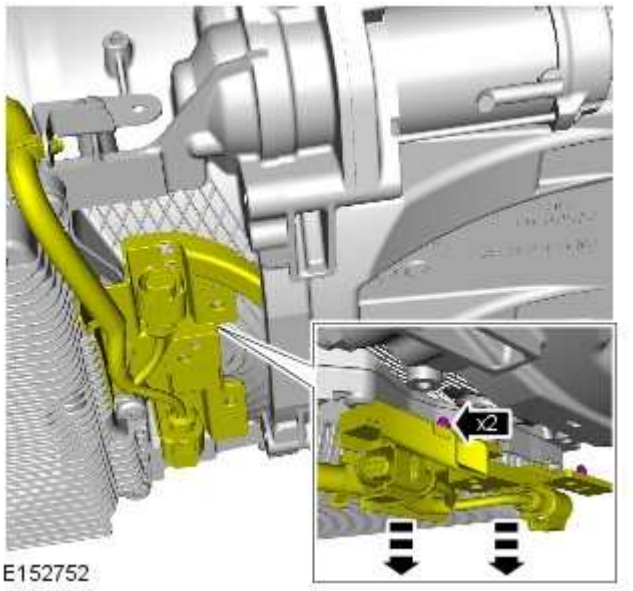
Secure with cable ties.

cardiagn.com



E152751

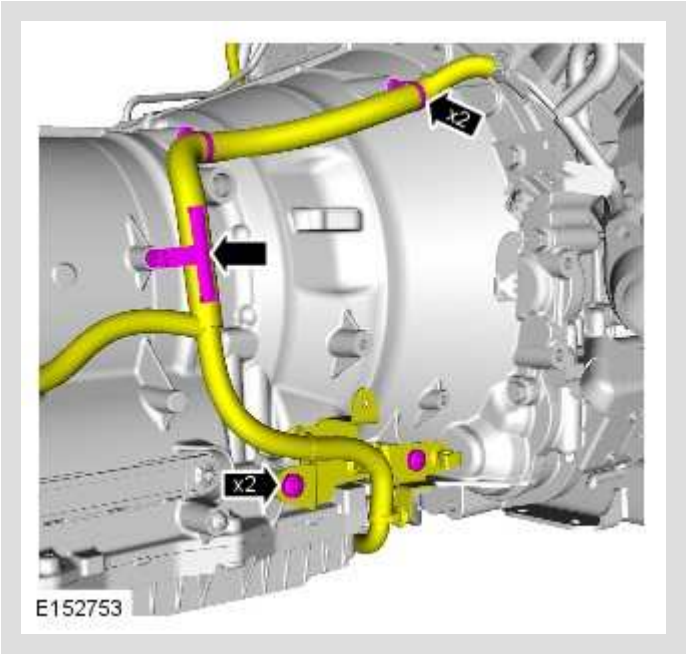
22.



E152752

23.

cardiagn.com

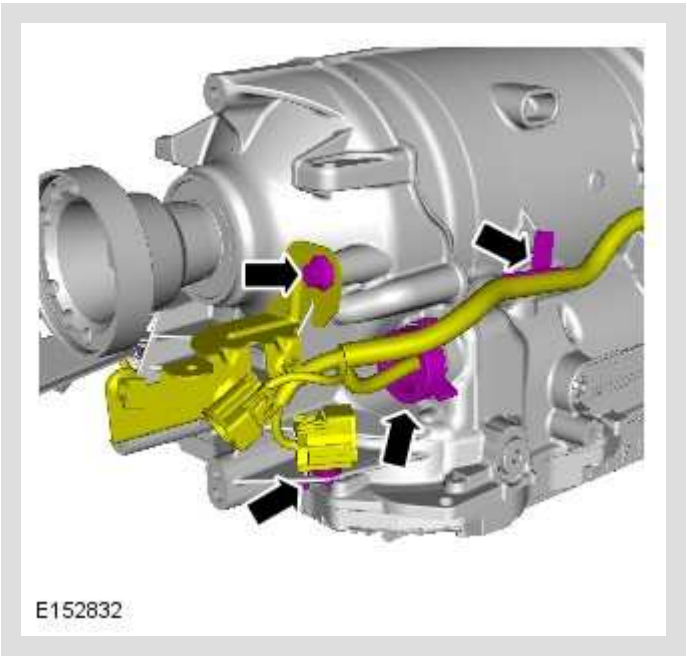


24.

NOTE:

Secure with cable ties.

cardiagn.com

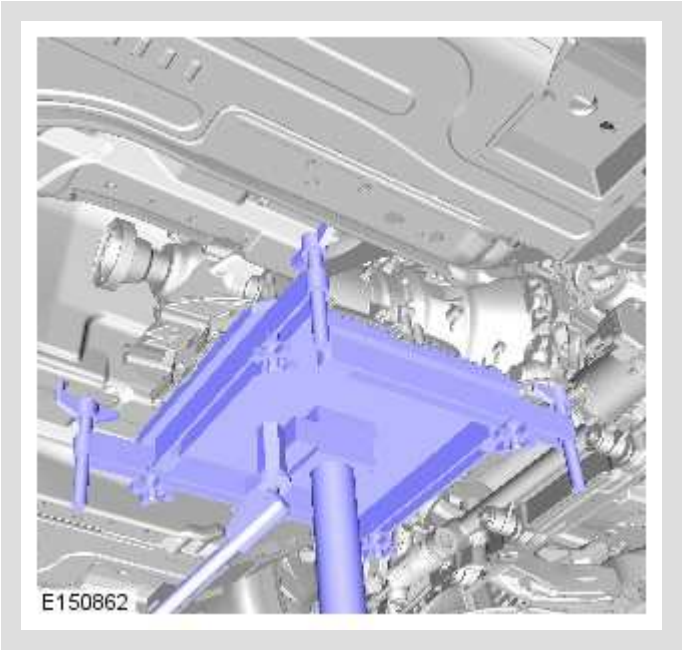


25.

WARNING:

Make sure that the transmission is secured with suitable retaining straps.

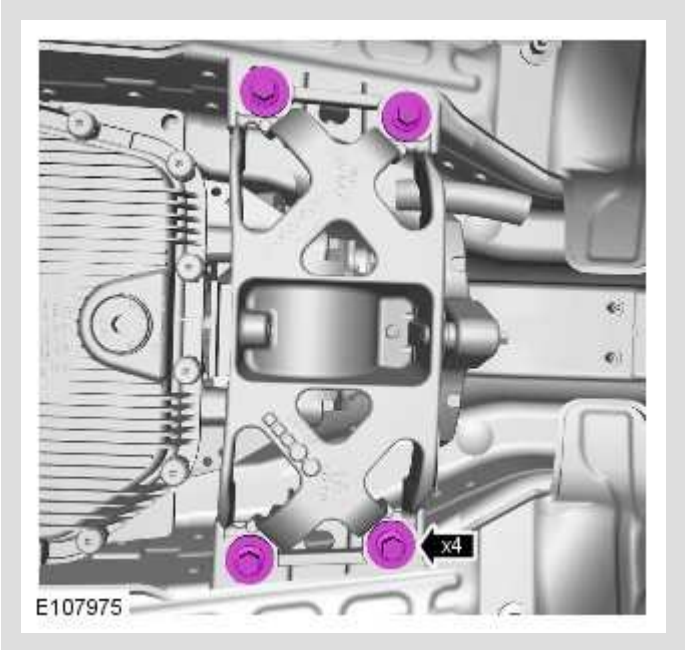
cardiagn.com



Using a suitable stand, support the transmission.

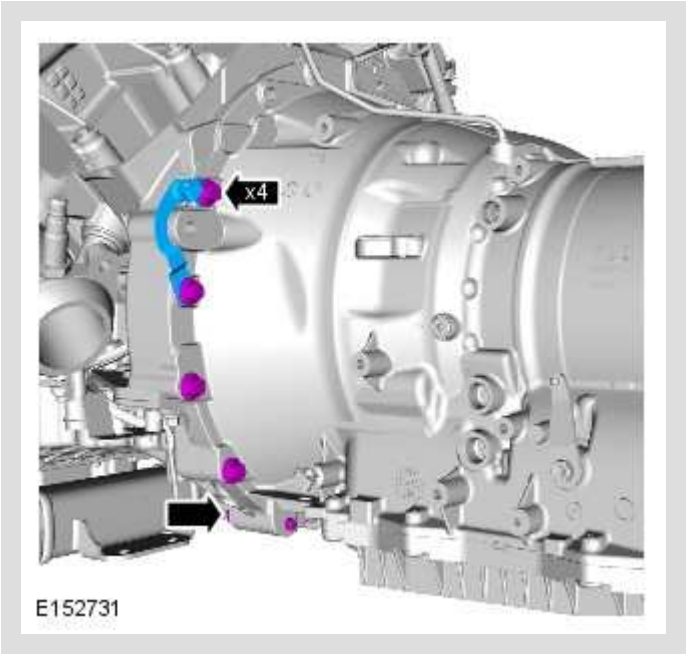
General Equipment: Transmission jack

26.

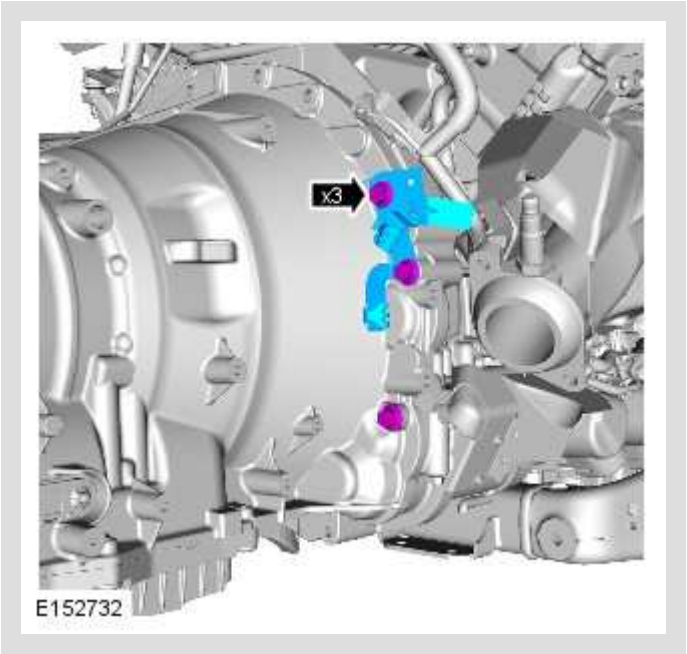


27.

cardiagn.com



28.



29.

WARNING:

This step requires the aid of another technician.

CAUTIONS:

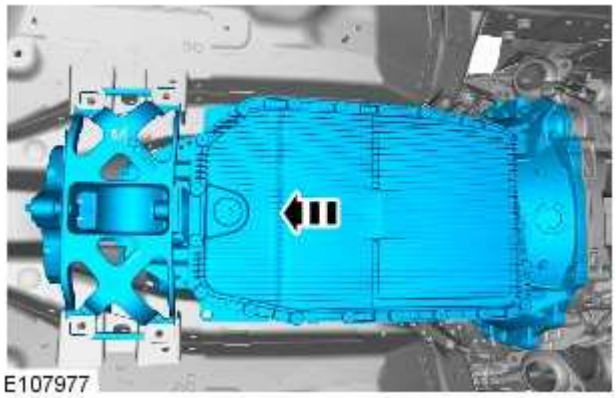
cardiagn.com

Care must be taken to avoid damaging the surrounding components.

Make sure that the torque converter remains in the transmission.

NOTE:

Secure the torque converter to the transmission using suitable cable ties.

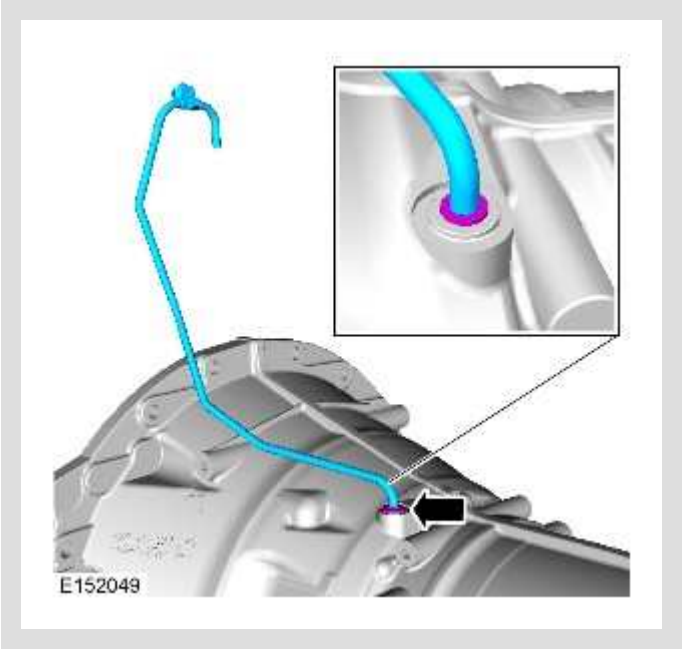


30.

CAUTION:

Always plug any open connections to prevent contamination.

cardiagn.com

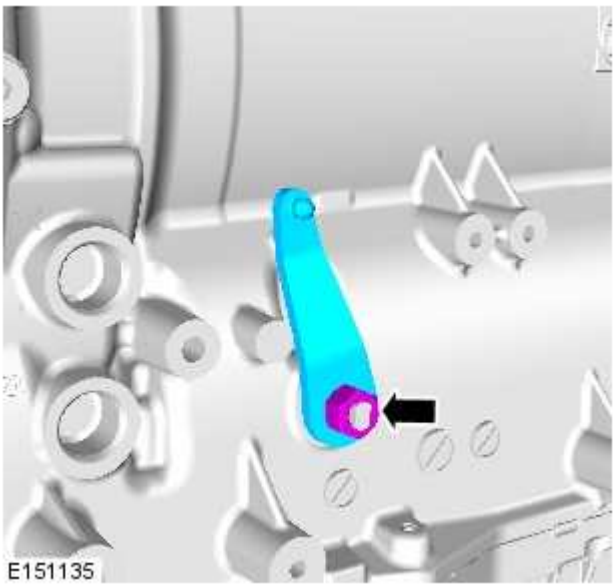


31.

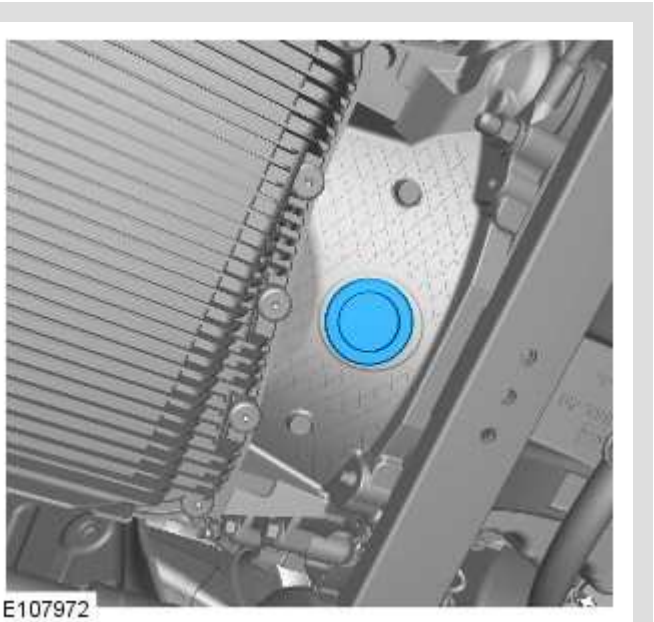
NOTE:

Do not disassemble further if the component is removed for access only.

cardiagn.com

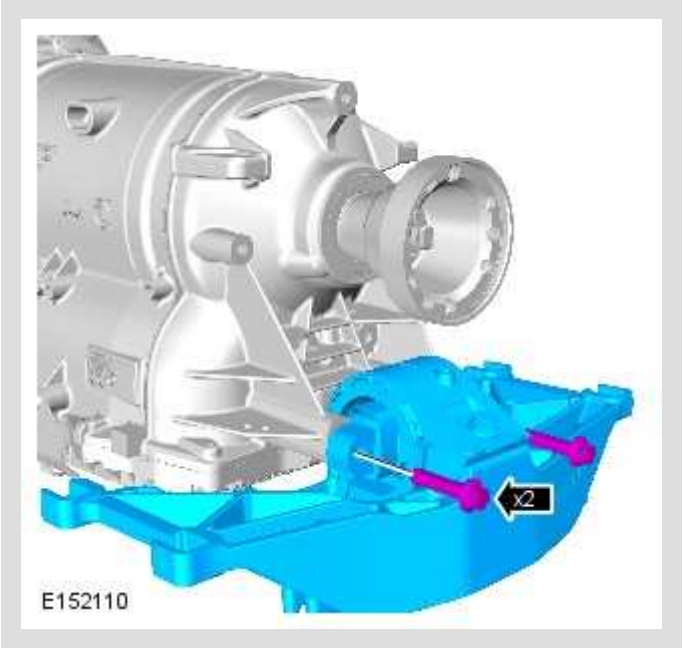


32.



33.

cardiagn.com



cardiagn.com

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

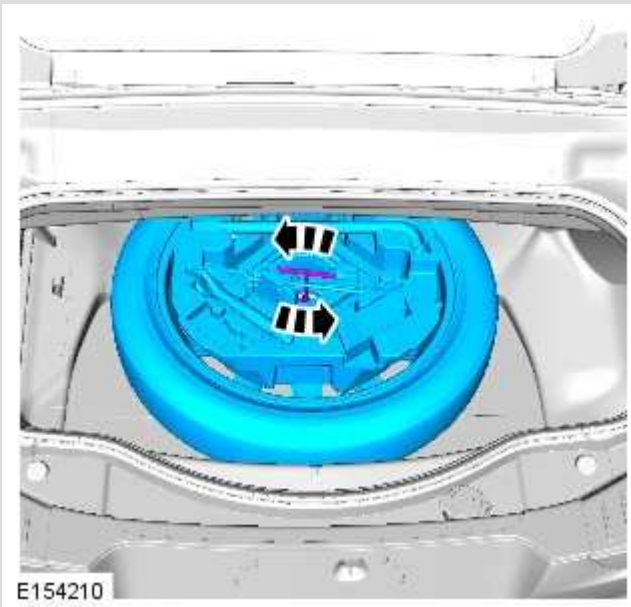
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS	

△ NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

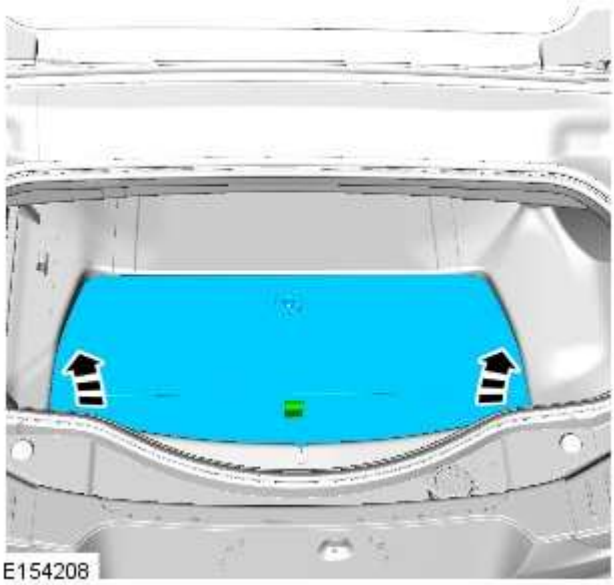
1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

2. Obtain and record the audio unit preset radio frequencies.

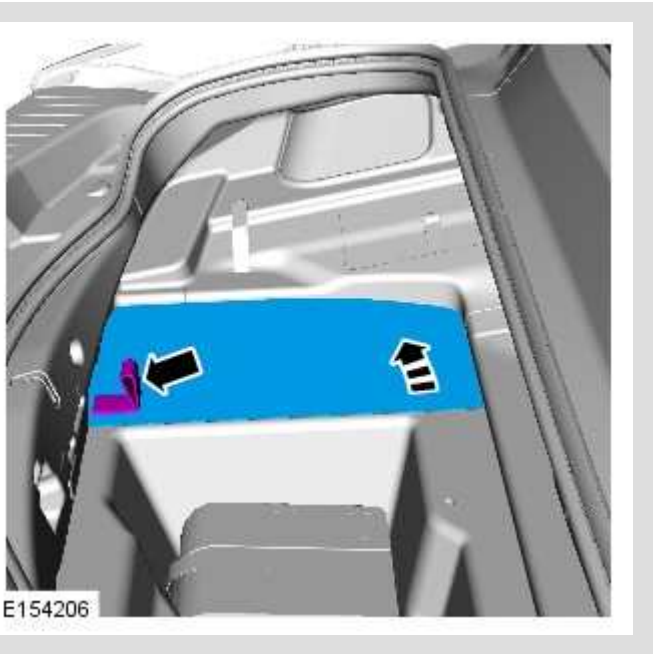
3. 

4.

cardiagn.com



5.

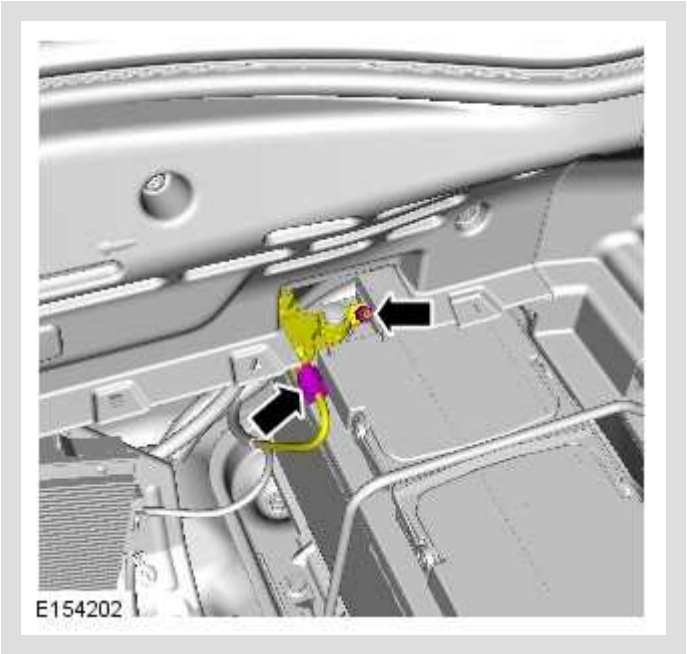


6.

CAUTION:

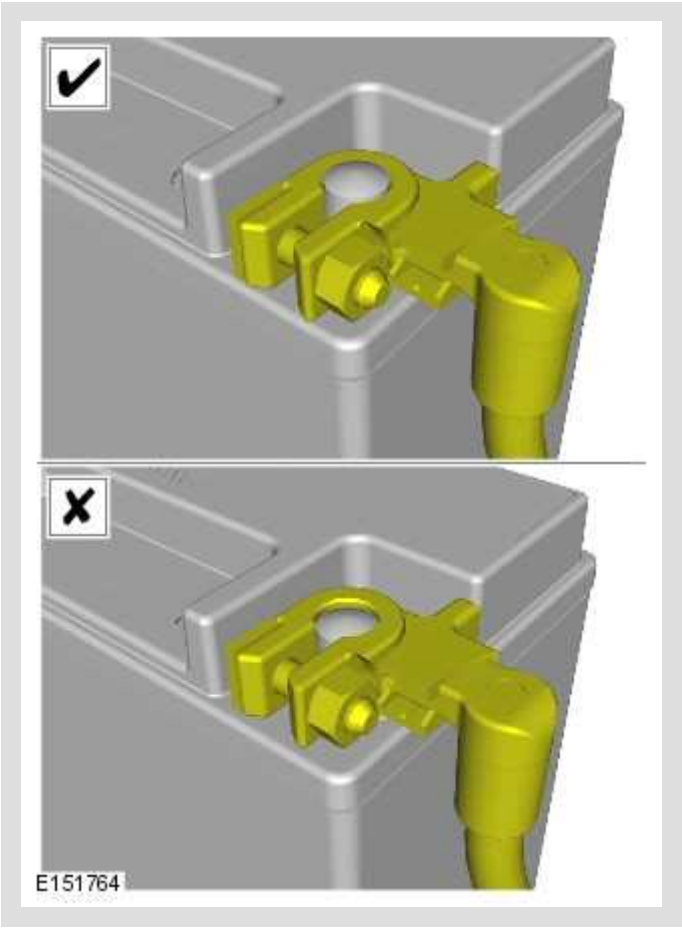
cardiagn.com

Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.



8. To install, reverse the removal procedure.

cardiagn.com

9. **NOTE:**

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

TRANSMISSION (G1579985)

INSTALLATION

37.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	3.6	USED WITHINS	
	TRANSMISSION	3000 CC,			

44.20.01	ASSEMBLY - RENEW	AJ V6 (AJ126)	4.9	USED WITHINS	
44.20.01.90	TRANSMISSION ASSEMBLY - REMOVE FOR ACCESS, AND INSTALL	3000 CC, AJ V6 (AJ126), 2WD	4.7	USED WITHINS	
86.75.50	FRONT SEAT TRACK MOTOR - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	

INSTALLATION

SPECIAL TOOL(S)

303-021

Engine support bracket

303-1435

Engine Lifting Brackets Rear

cardiagn.com

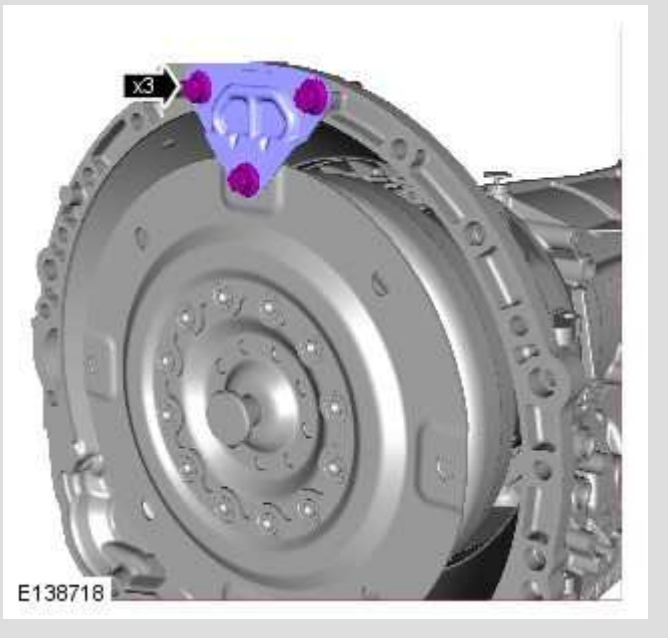
NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the transmission removed for clarity.

1.

NOTE:

This step is only required if a new component is installed.

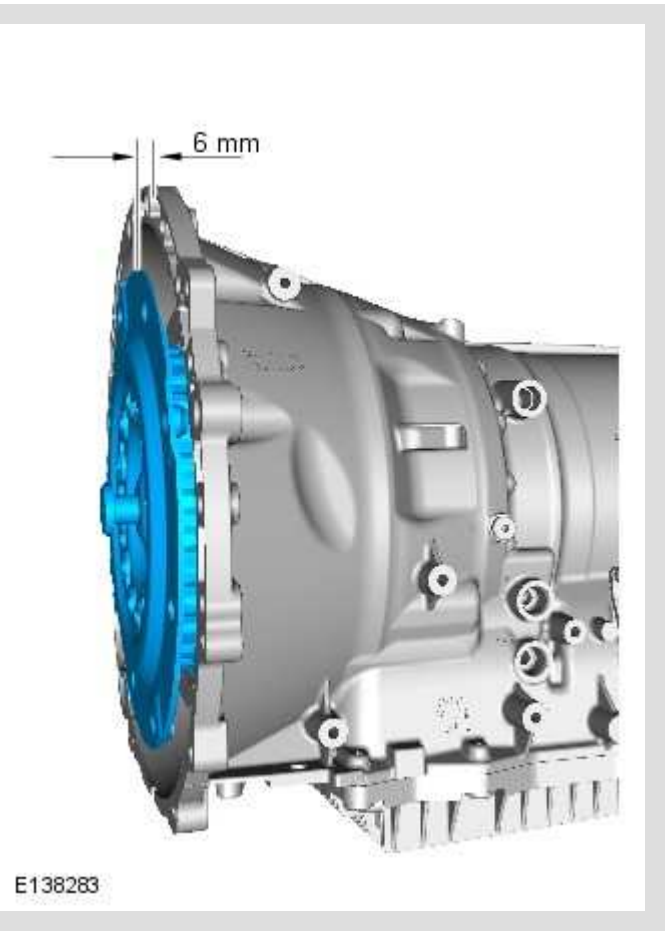


2.

NOTE:

Make sure that the torque converter is fully engaged to the transmission.

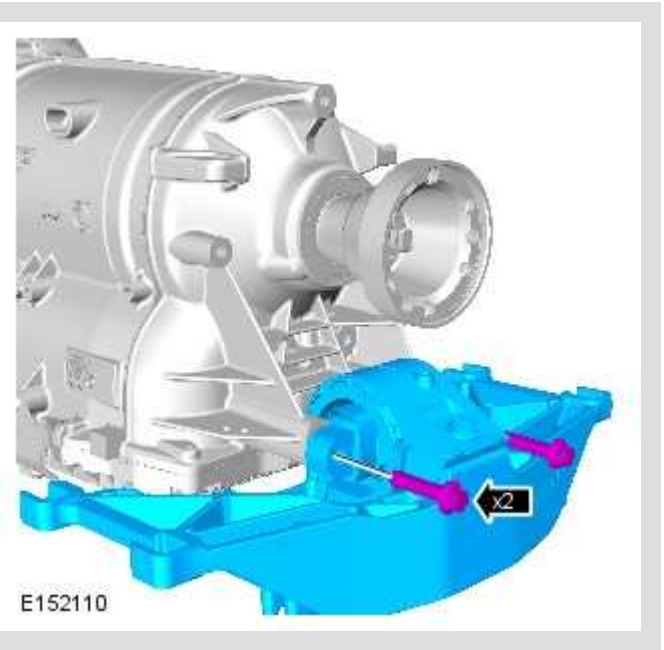
cardiagn.com



3.

NOTE:

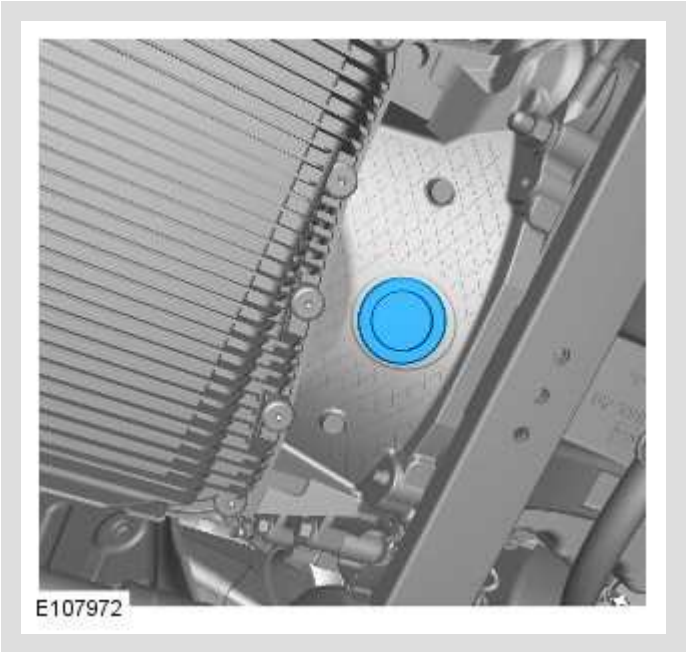
This step is only required if previously removed.



cardiagn.com

Torque: **48 Nm**

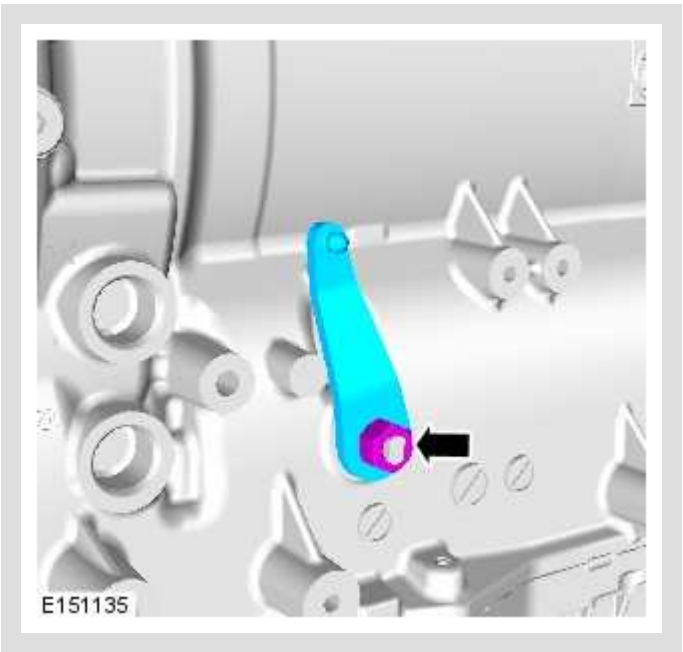
4.



5.

NOTE:

This step is only required if a new component is installed



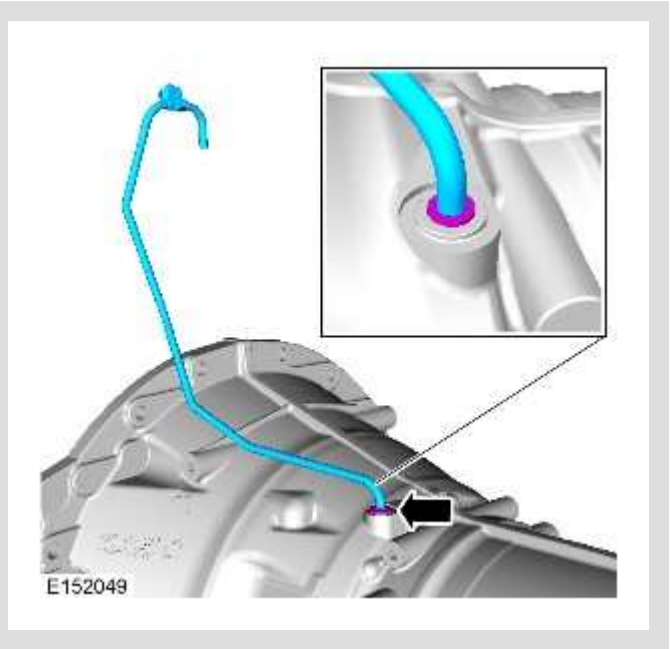
Torque: **12 Nm**

6.

CAUTION:

cardiagn.com

To prevent water ingress and subsequent transmission damage, make sure that the breather is fully pushed home into the transmission casing. The white line around the circumference of the pipe should not be visible when correctly installed.



7.

WARNINGS:

This step requires the aid of another technician.

Make sure that the transmission is secured with suitable retaining straps.

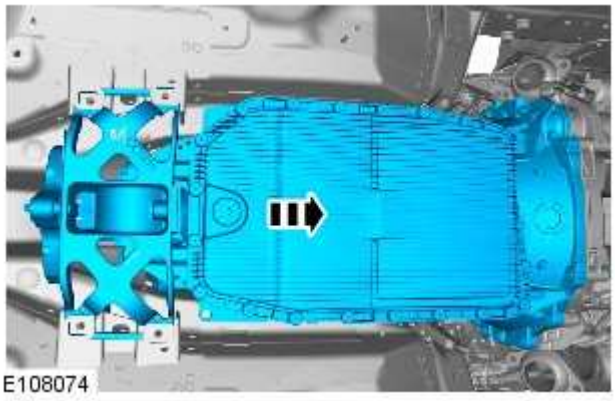
CAUTIONS:

Make sure that the torque converter remains in the transmission.

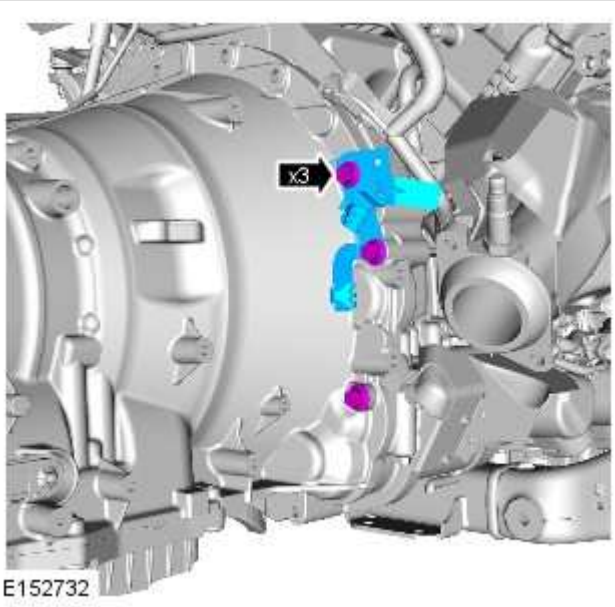
cardiagn.com

Remove and discard the cable ties securing the torque converter.

Apply grease of the correct specification to the torque converter spigot.



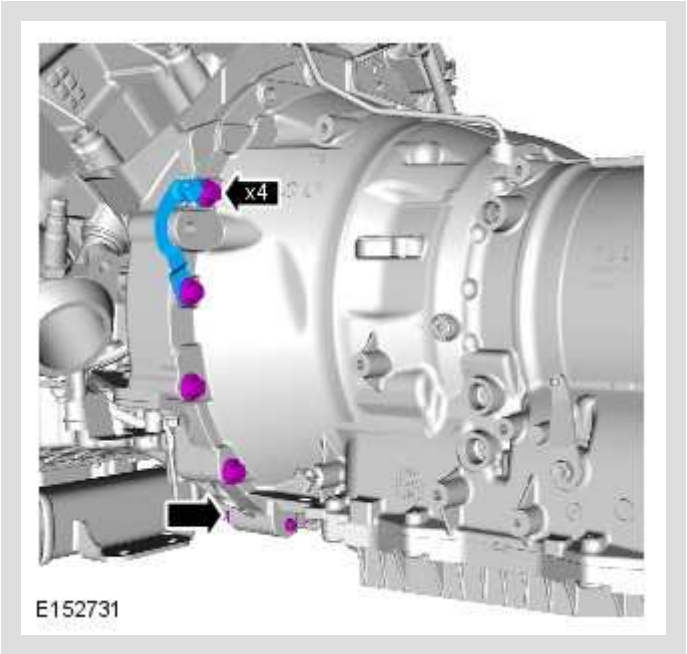
8.



Torque: **48 Nm**

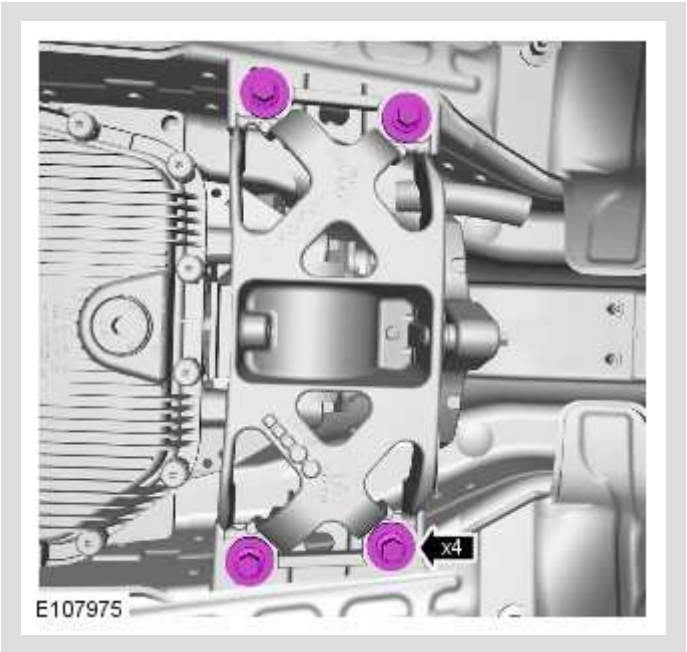
9.

cardiagn.com



Torque: **48 Nm**

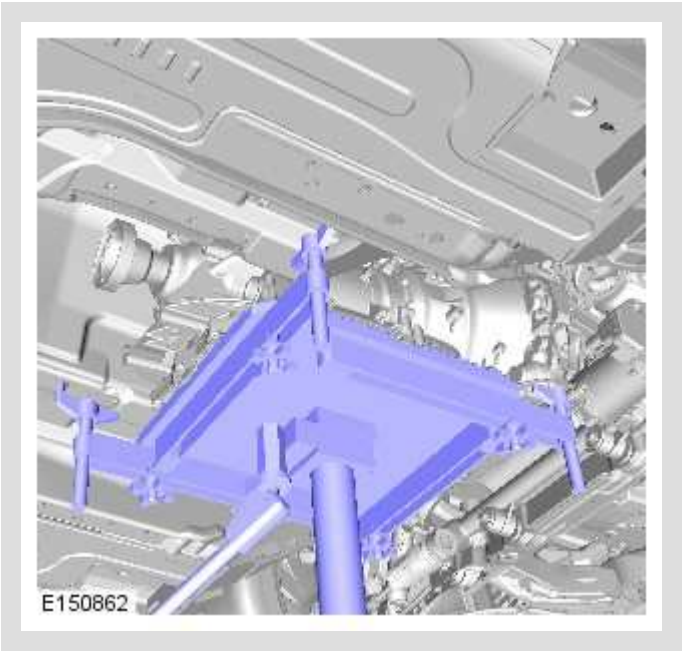
10.



Torque: **45 Nm**

11.

cardiagn.com

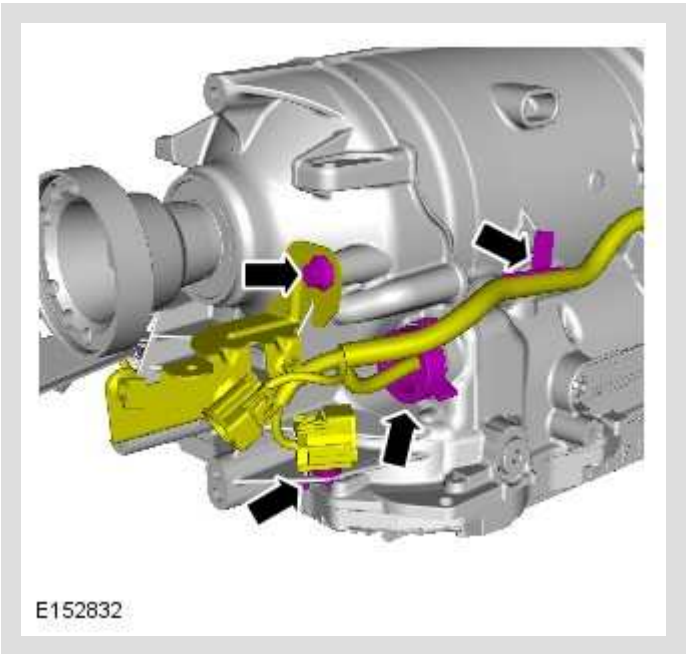


Remove the jack supporting the transmission.

12.

CAUTION:

If necessary, install new clips.



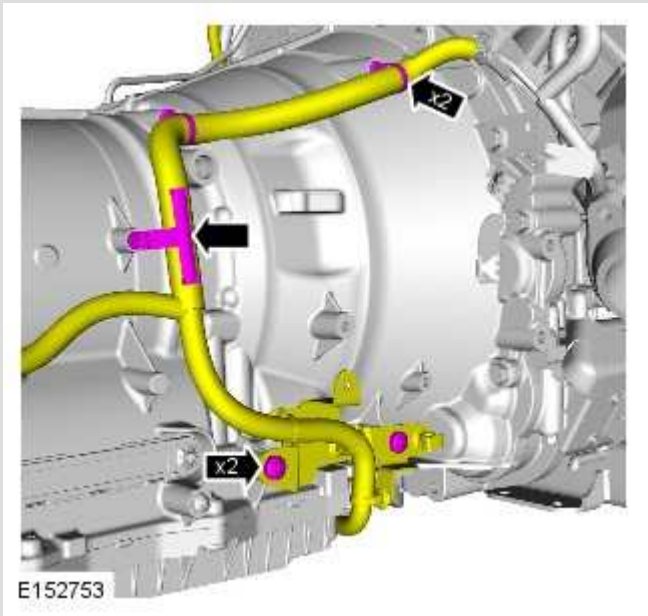
Torque: **15 Nm**

13.

cardiagn.com

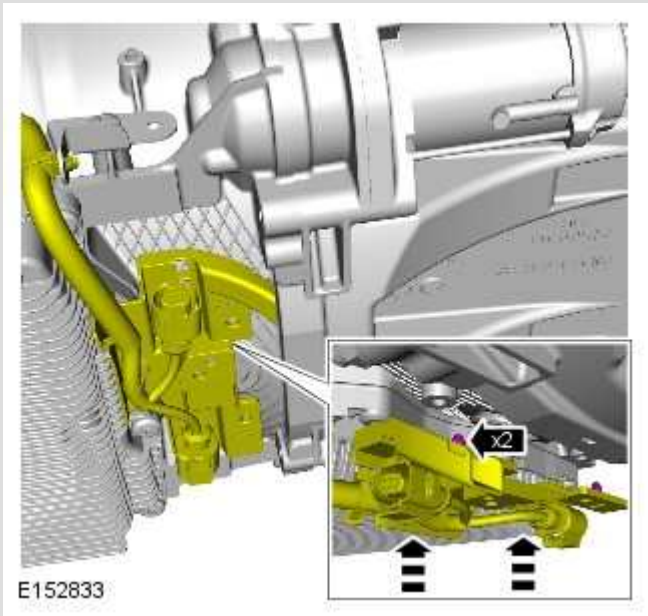
CAUTION:

If necessary, install new clips.



Torque: **15 Nm**

14.

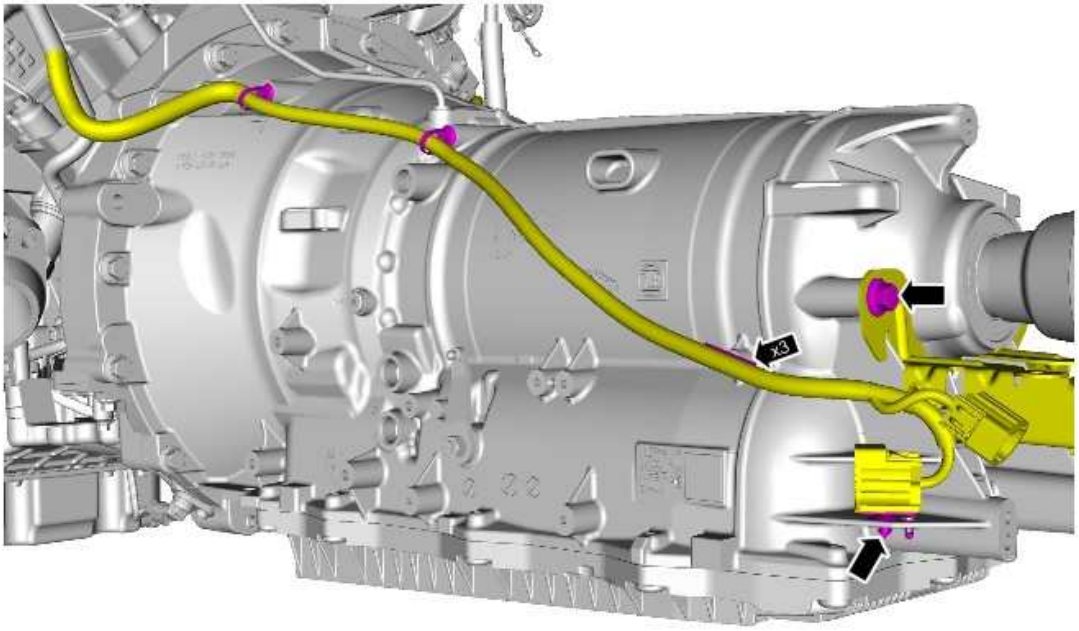


15.

CAUTION:

If necessary, install new clips.

cardiagn.com



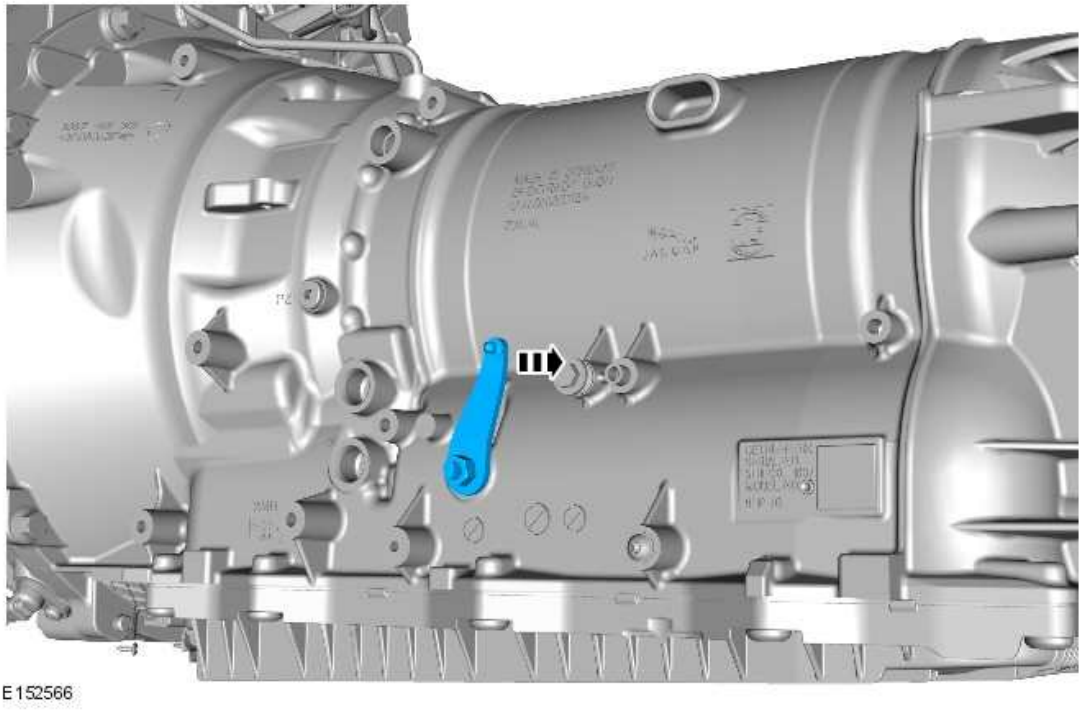
Torque: **12 Nm**

16.

CAUTION:

Secure with a cable tie.

cardiagn.com



17.

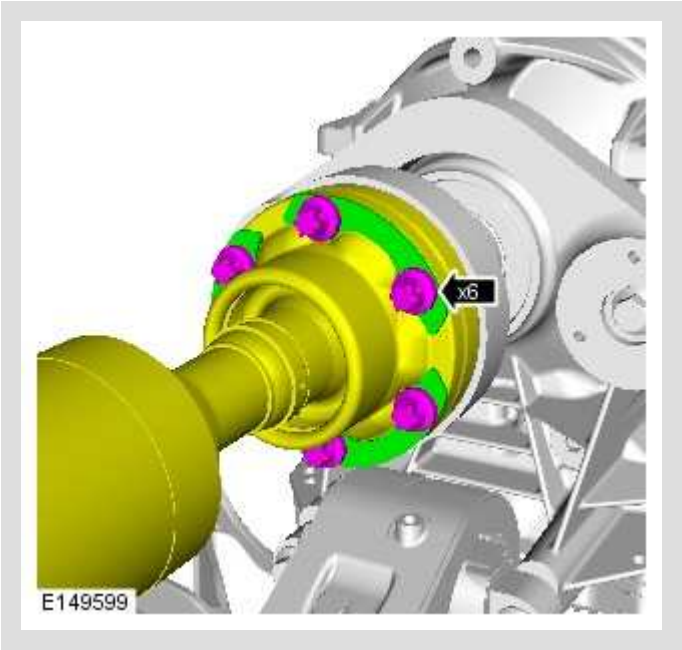
CAUTION:

Make sure that new bolts are installed.

NOTE:

Make sure that you re-align the driveshaft to the transmission flange using the alignment mark.

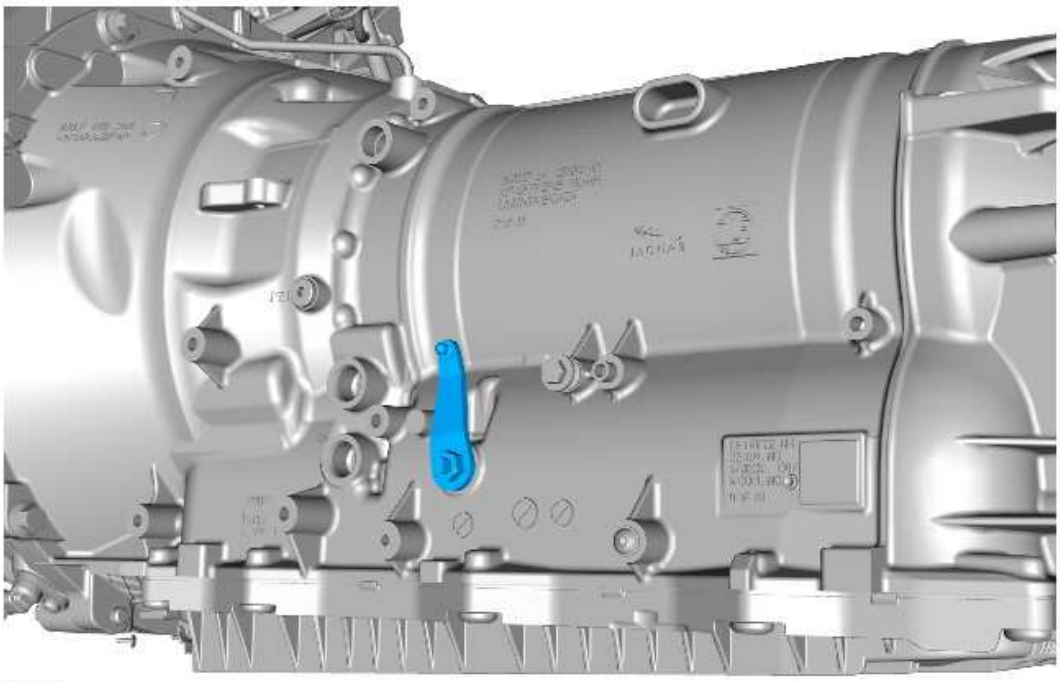
cardiagn.com



Torque: **75 Nm**

18.

cardiagn.com



CAUTION:

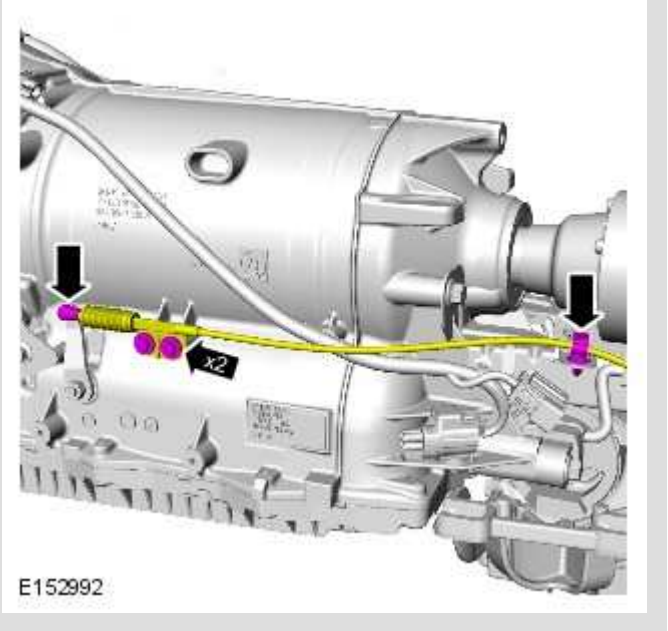
Remove the cable tie.

19.

CAUTION:

If necessary, install new clip.

cardiagn.com

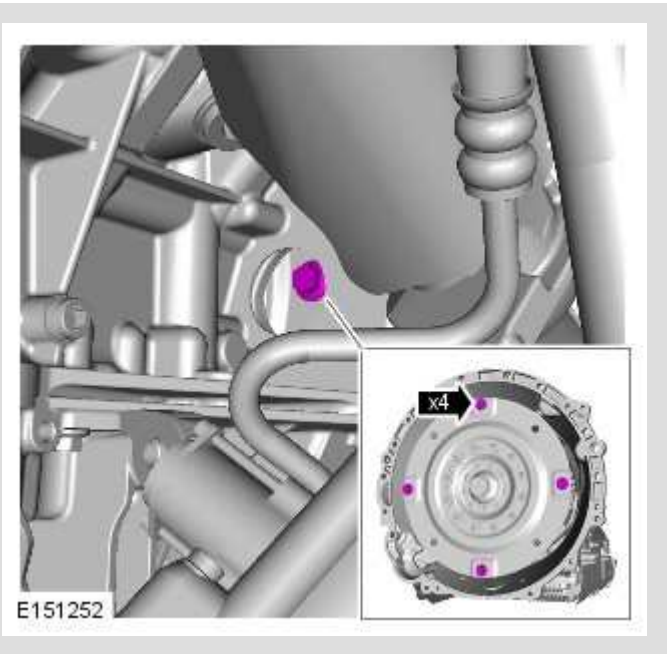


Torque: **11 Nm**

20.

CAUTIONS:

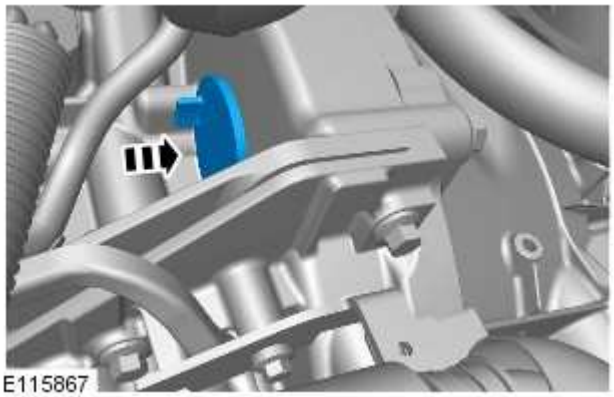
- Only rotate the crankshaft clockwise.
- Make sure that new bolts are installed.



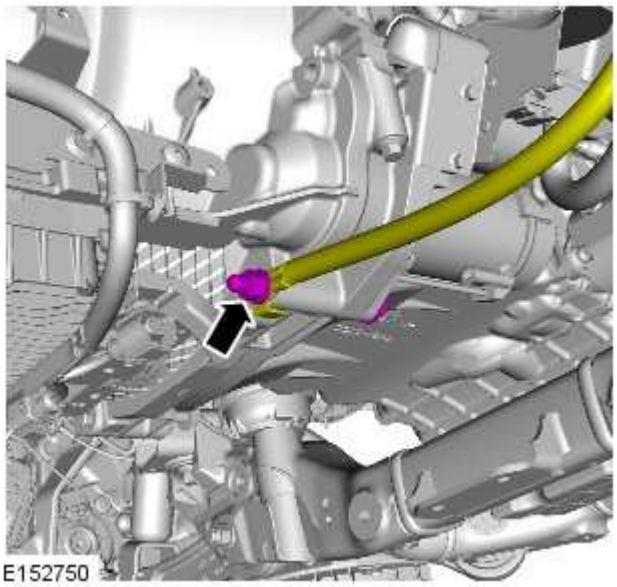
Torque: **63 Nm**

cardiagn.com

21.



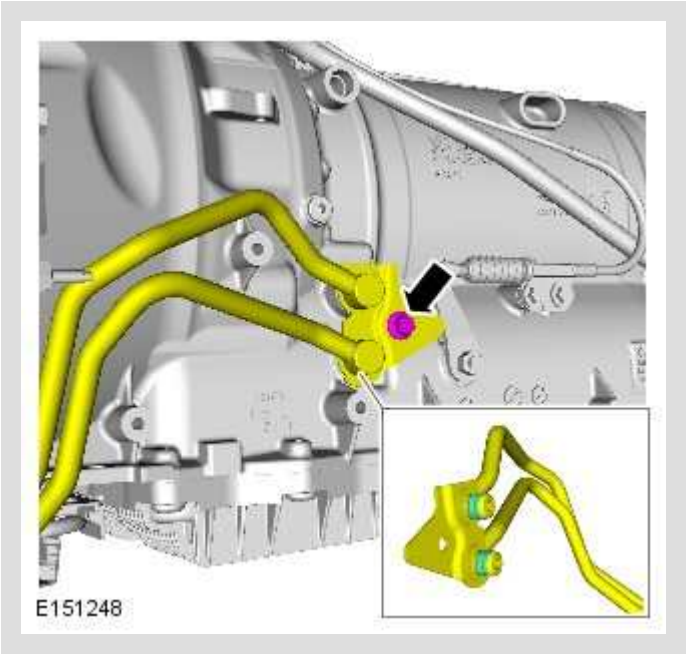
22.



Torque: **48 Nm**

23.

cardiagn.com



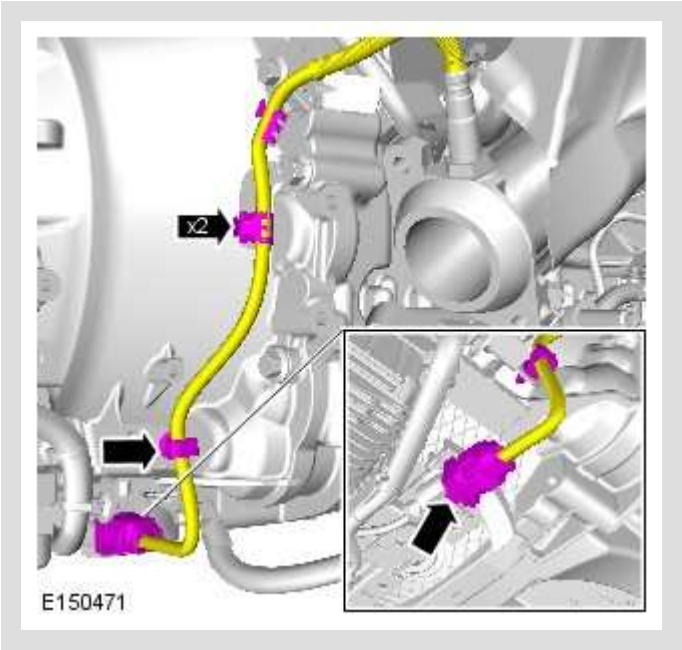
Torque: **22 Nm**

24.

CAUTION:

If necessary, install new clip.

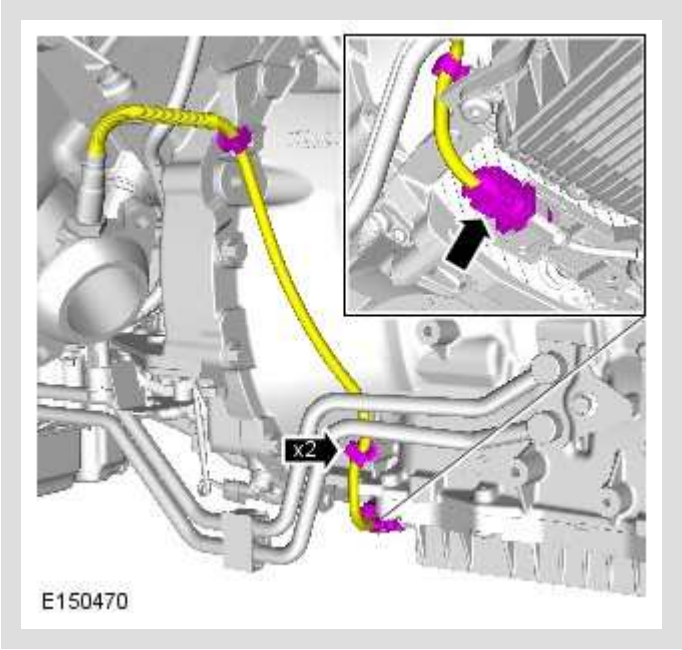
cardiagn.com



25.

CAUTION:

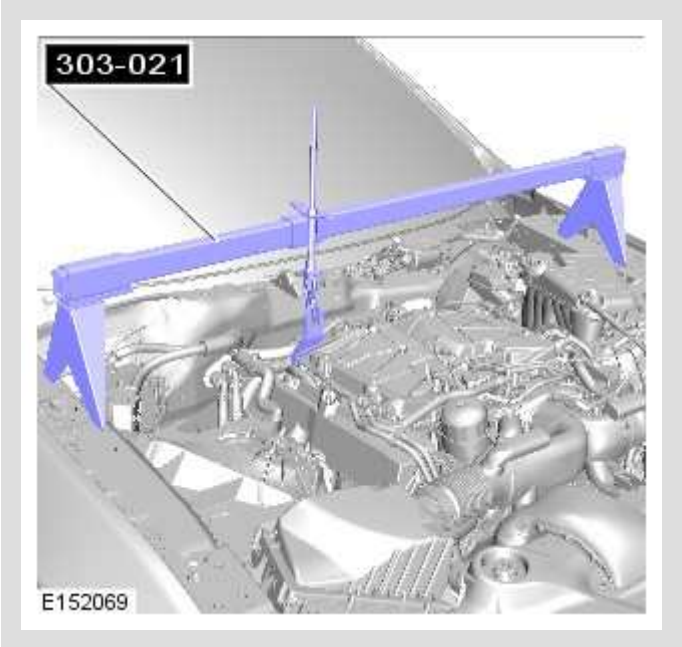
If necessary, install new clips.



cardiagn.com

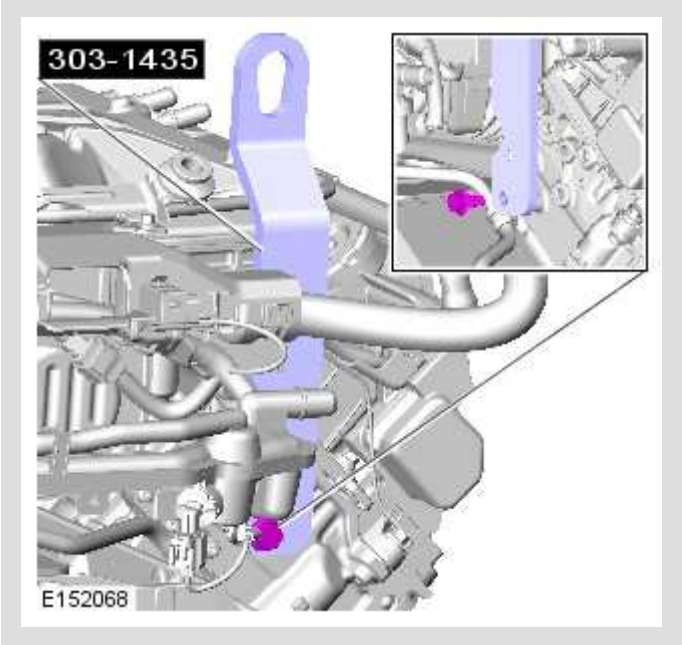
26. Refer to: Catalytic Converter LH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).
Refer to: Catalytic Converter RH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

27.



Special Tool(s): 303-021

28.



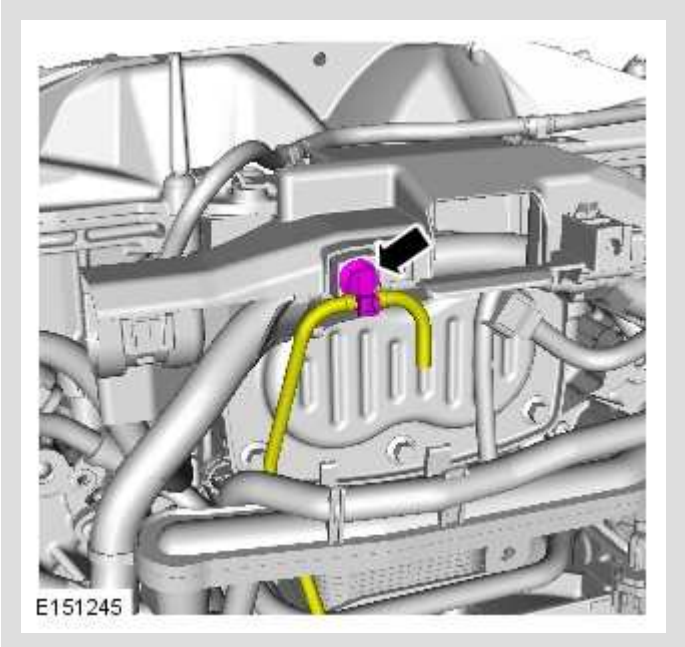
Special Tool(s): 303-1435

cardiagn.com

29.

Torque: **48 Nm**

30.



31. Refer to: Cowl Panel (501-02 Front End Body Panels, Removal and Installation).

32. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

33. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

34. Refer to: Transmission Fluid Level Check (307-01B Automatic Transmission/Transaxle - V8 S/C 5.0L Petrol, General Procedures).

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

FRONT DYNAMIC BALANCER (G1587979)

REMOVAL AND INSTALLATION

12.49.19	DYNAMIC BALANCER - FRONT - RENEW	3000 CC, AJ V6 (AJ126)	14.2	USED WITHINS	

SPECIAL TOOL(S)

JLR-303-1303

Timing Tool

REMOVAL

cardiagn.com

NOTES:

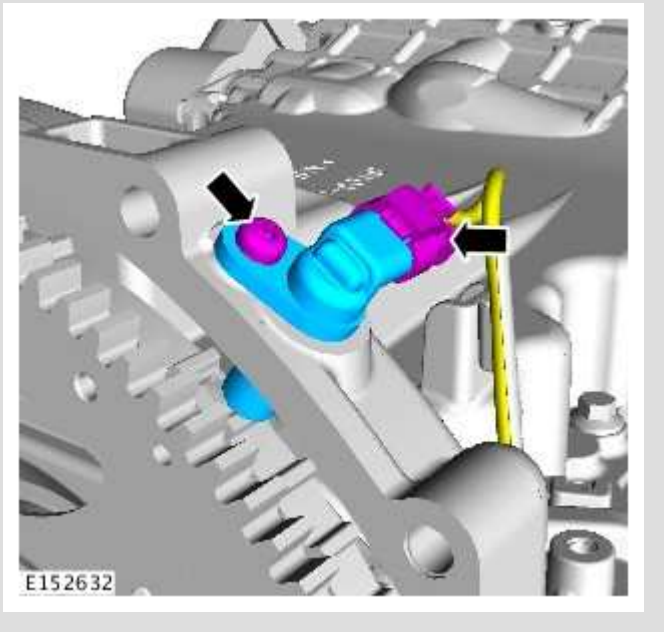
- Removal steps in this procedure may contain installation details.
- Some components shown removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

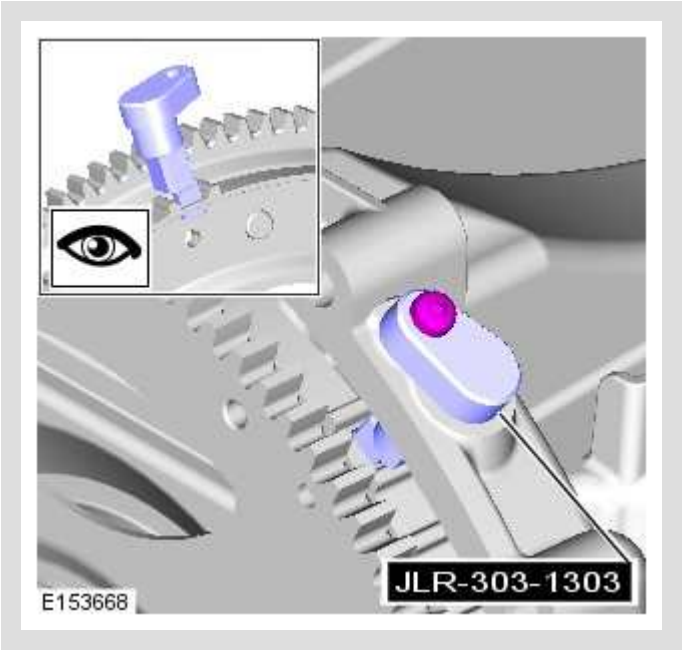
   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. 

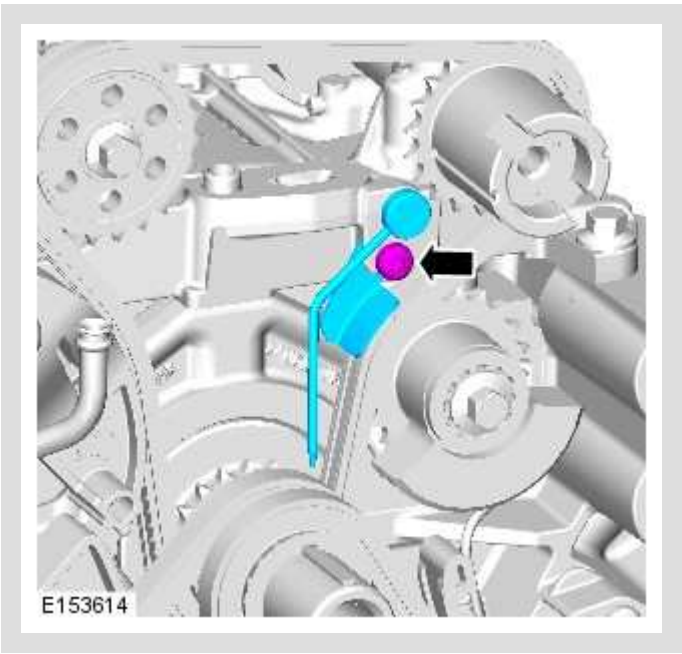
4.

cardiagn.com



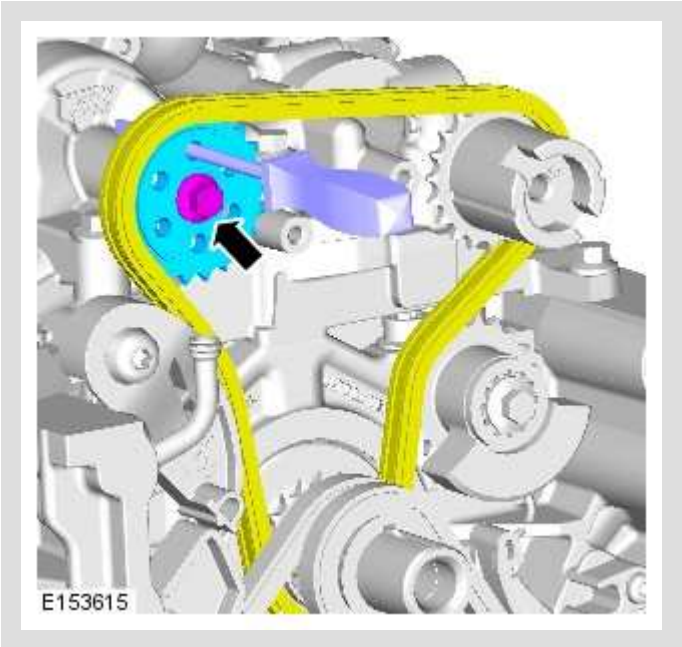
Special Tool(s): JLR-303-1303

5. Refer to: Oil Pan (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

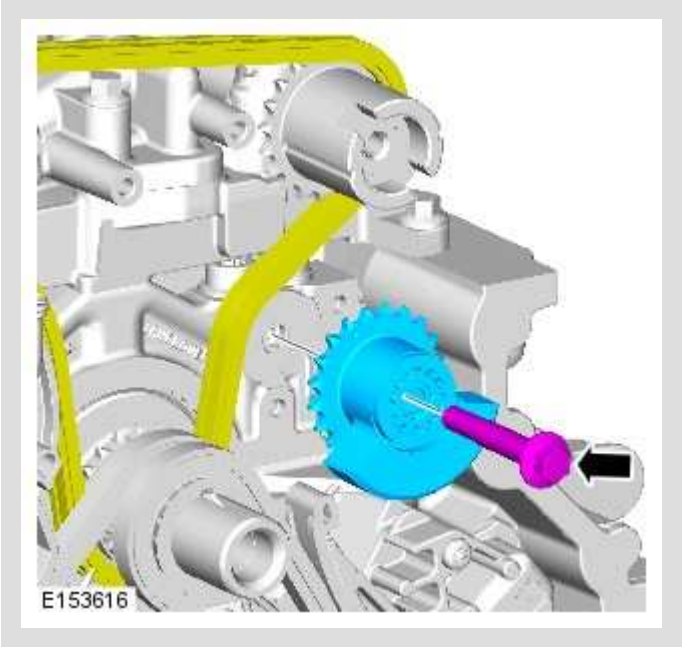
6. 

7.

cardiagn.com



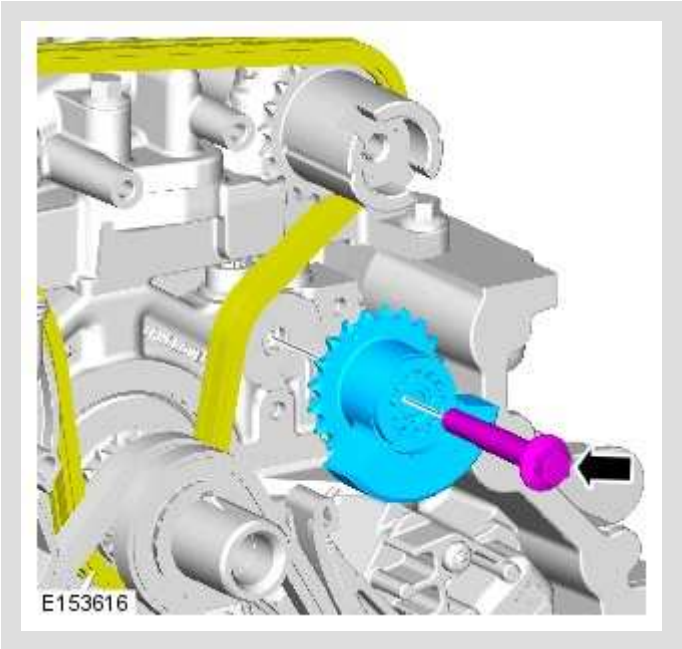
8.



INSTALLATION

1.

cardiagn.com

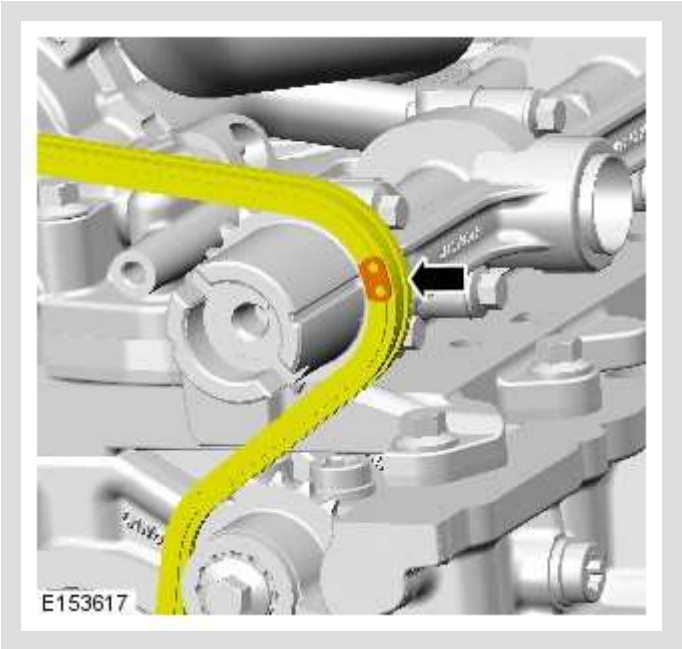


Torque:

Stage 1 **25 Nm**

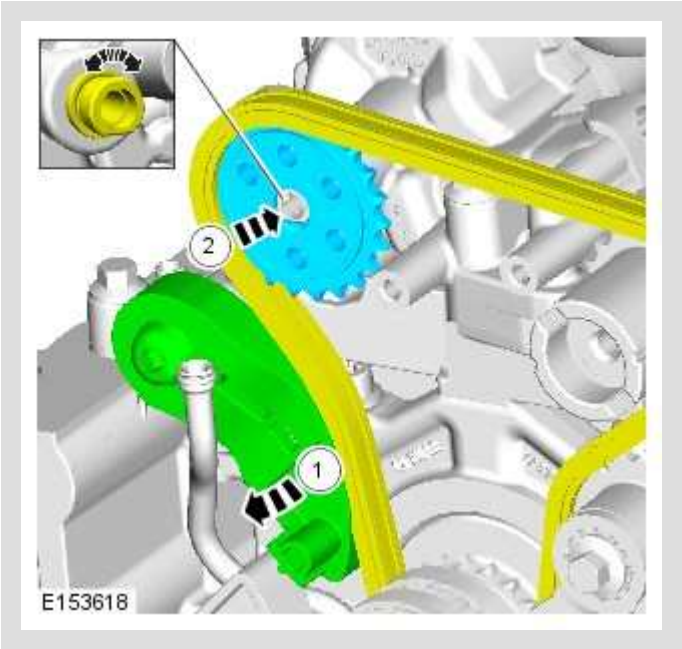
Stage 2 **30°**

2.



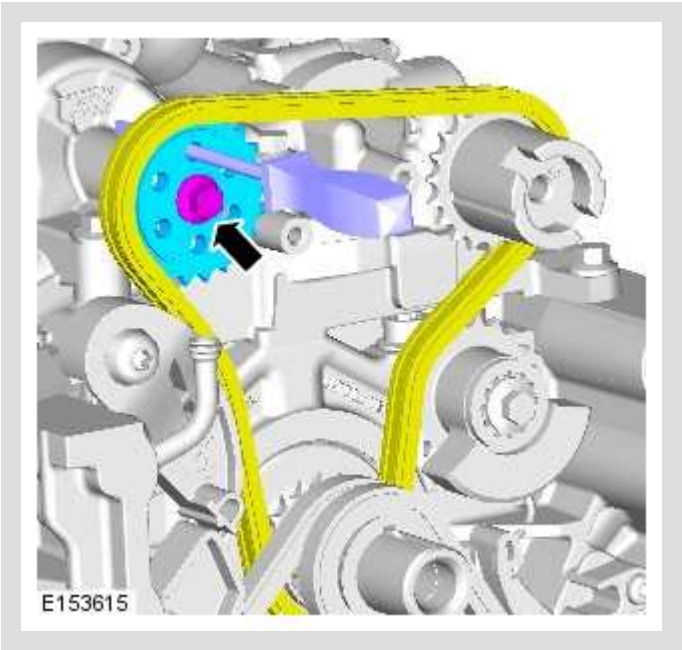
3.

cardiagn.com



Using a suitable tool, compress the timing chain tensioner.

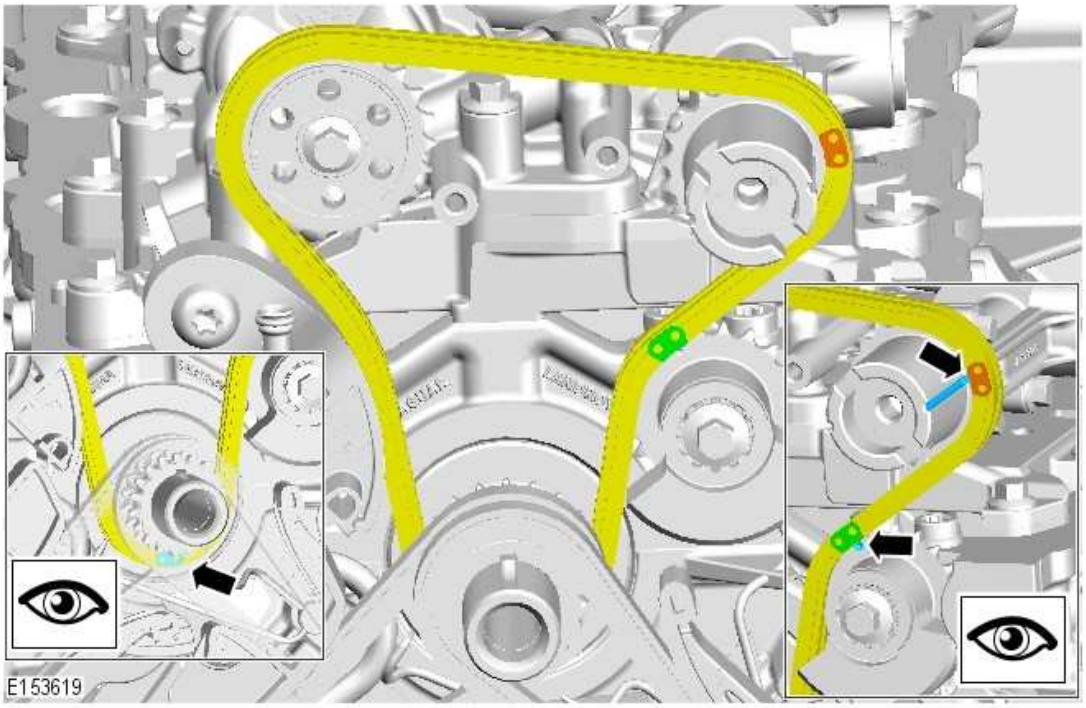
4.



Torque: **21 Nm**

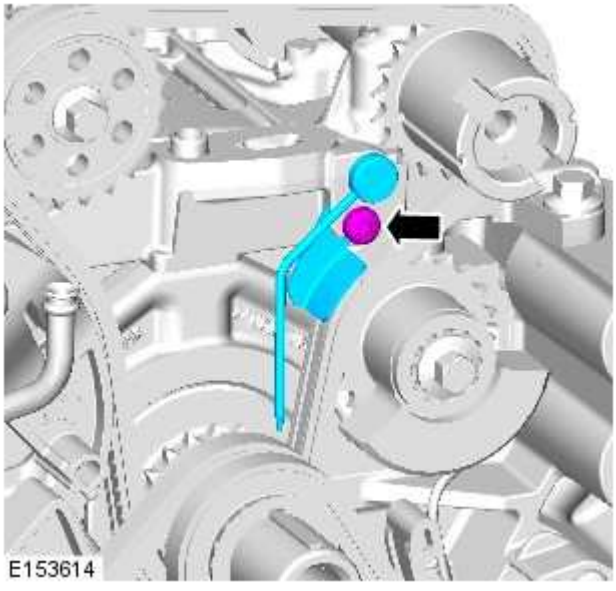
5.

cardiagn.com



Install the lower timing chain making sure the coloured chain links align correctly with the fuel rail high-pressure fuel pumps camshaft and crankshaft sprocket markings.

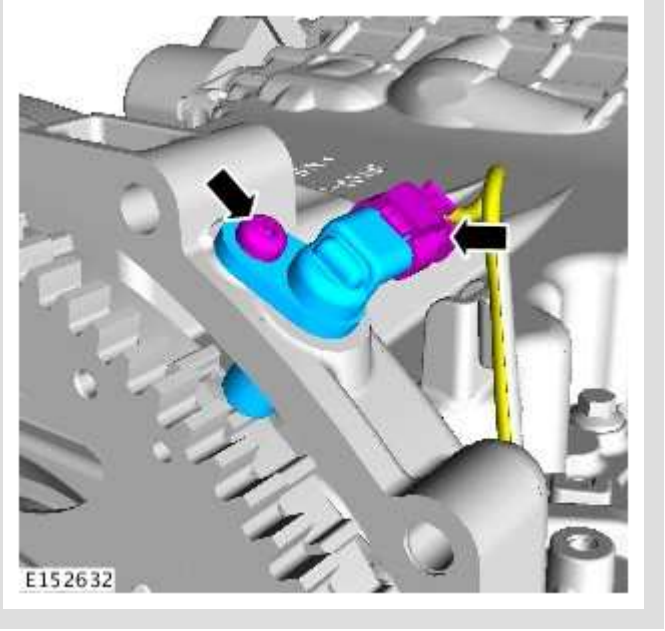
6.



Torque: **11 Nm**

cardiagn.com

7. Refer to: Oil Pan (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

8. 

Torque: **10 Nm**

9. Disconnect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V8 S/C 5.0L PETROL

OIL PAN (G1584114)

REMOVAL AND INSTALLATION

12.60.44	OIL PAN - RENEW	ALL DERIVATIVES	0.8	USED WITHINS	

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. Refer to: Engine Oil Level Sensor (303-14B Electronic Engine Controls - V8 S/C 5.0L Petrol, Removal and Installation).

4.

cardiagn.com

INSTALLATION

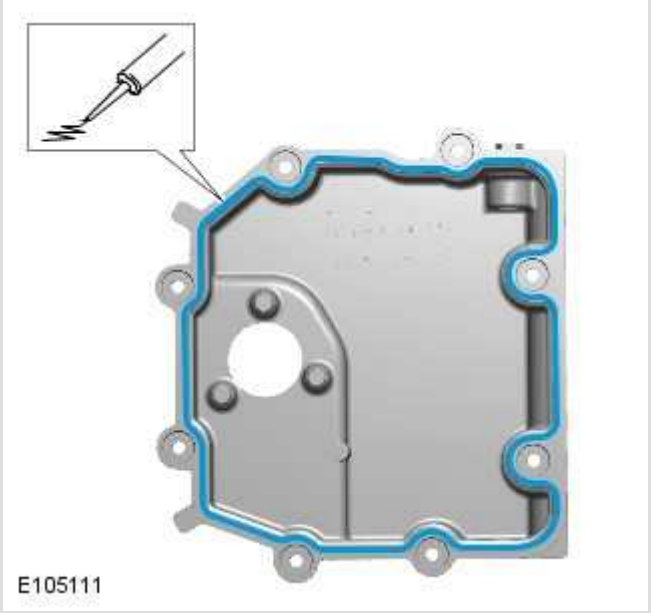
1.

CAUTIONS:

Use only a plastic scraper when removing the sealing material.

Use lint free cloth.

Make sure that the mating faces are clean and free of corrosion and foreign material.



Apply RTV sealant WSE-M4G323-A6 (Loctite 5901G or Loctite 5900) to the areas shown, and tighten the bolts within 7 minutes.

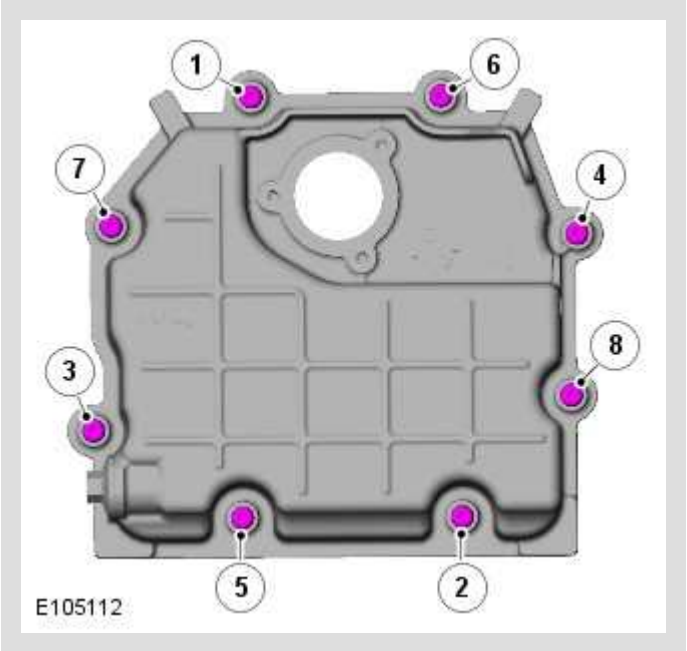
Apply a bead of sealant, 2.5 mm diameter, to the area indicated.

2.

cardiagn.com

CAUTION:

Tighten the bolts in the sequence shown.



Torque: **12 Nm**

3. Refer to: Engine Oil Level Sensor (303-14B Electronic Engine Controls - V8 S/C 5.0L Petrol, Removal and Installation).

4. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

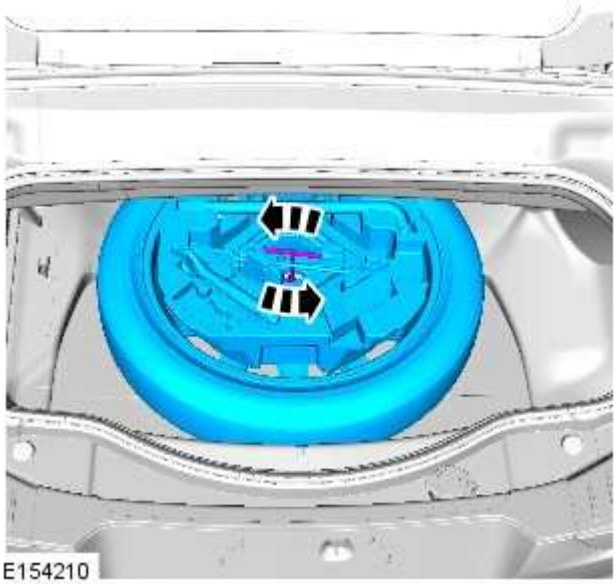
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

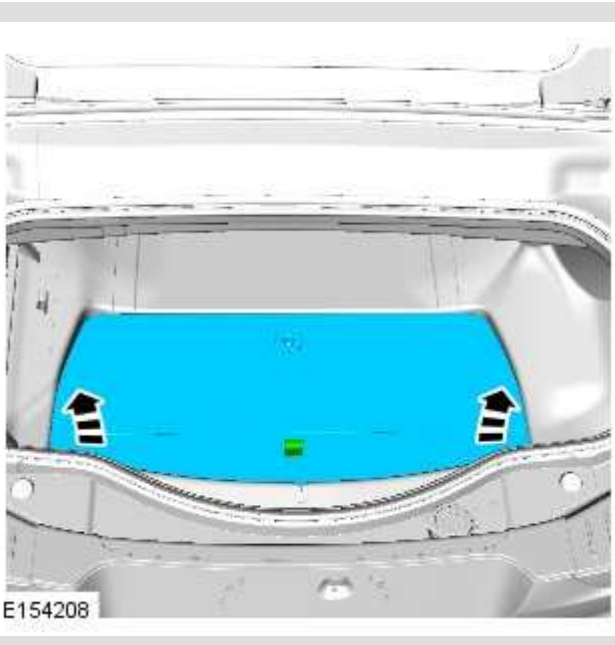
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

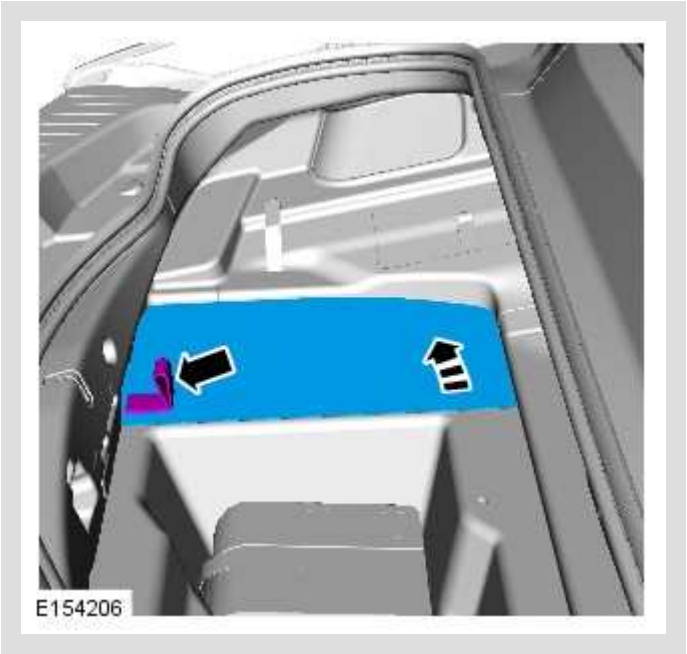


4.



cardiagn.com

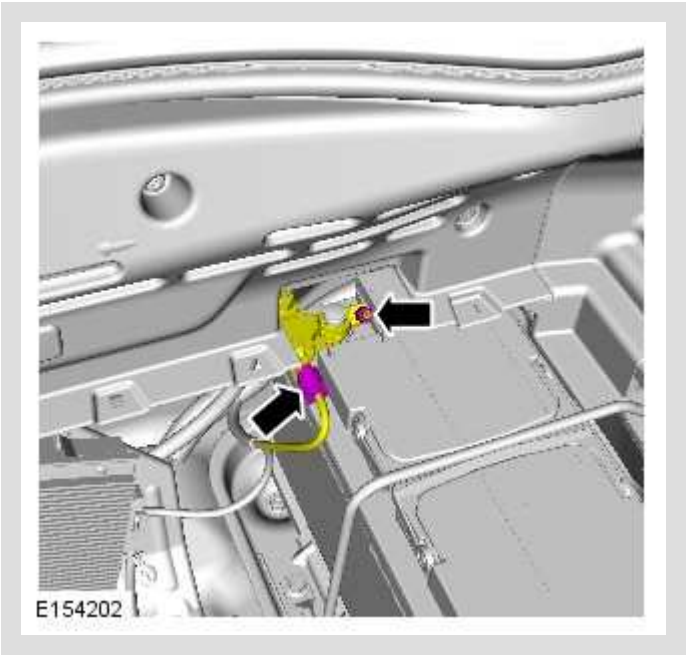
5.



6.

CAUTION:

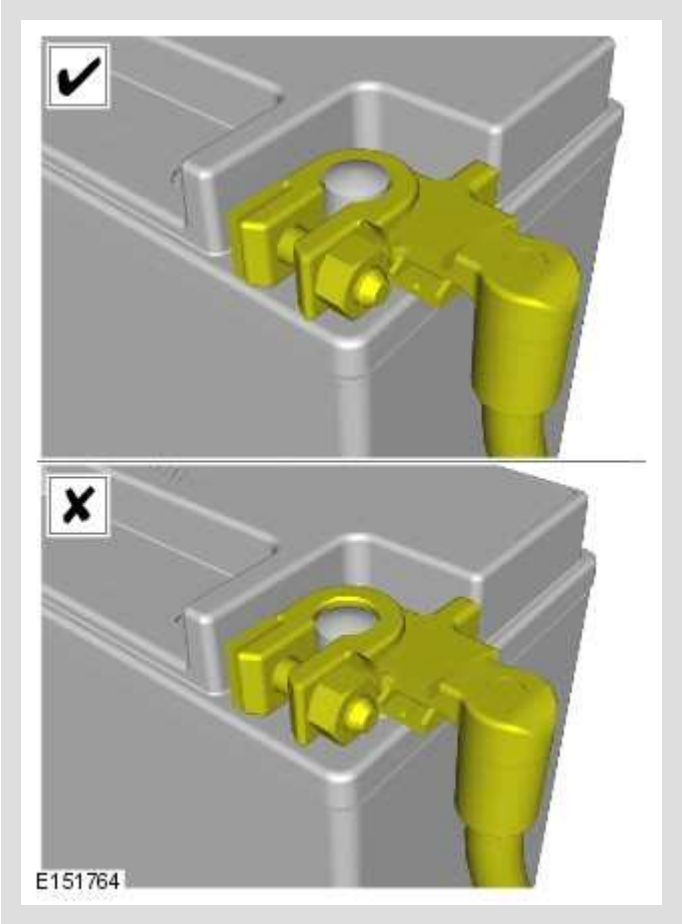
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

cardiagn.com

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

FUEL PUMP CAMSHAFT TIMING ADJUSTMENT

(G1717327)

GENERAL PROCEDURES

19.90.17	HIGH PRESSURE FUEL TIMING CHECK AND ADJUST	3000 CC, AJ V6 (AJ126)	5.9	USED WITHINS	

SPECIAL TOOL(S)

JLR-303-1303

Timing Tool

cardiagn.com

E140377	**JLR-303-1621** Alignment Tool, Fuel Pump Camshaft Timing

CHECK

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

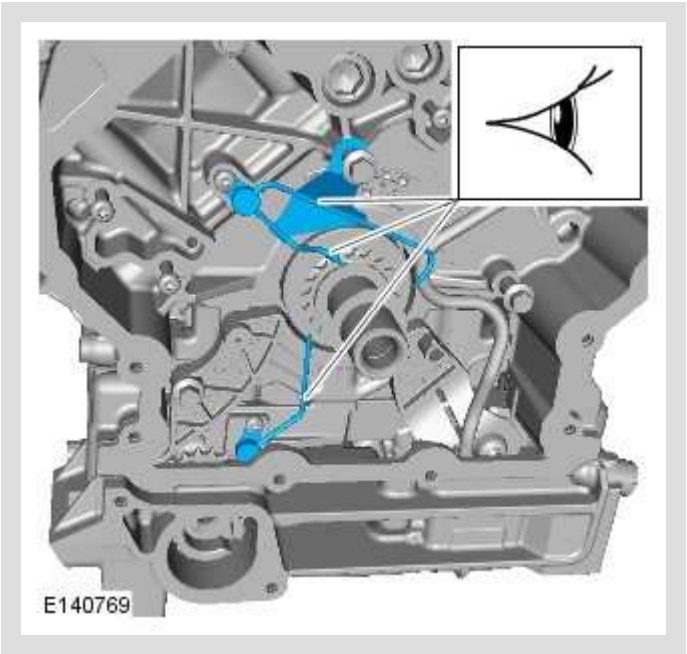
cardiagn.com

3. Refer to: Fuel Pump Camshaft Timing Check (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

4. Refer to: Lower Timing Cover (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

5. **CAUTIONS:**

- Make sure that the area around the component is clean and free of foreign material.
- Inspect the 3 timing chain oil nozzles for signs of damage, install as necessary.



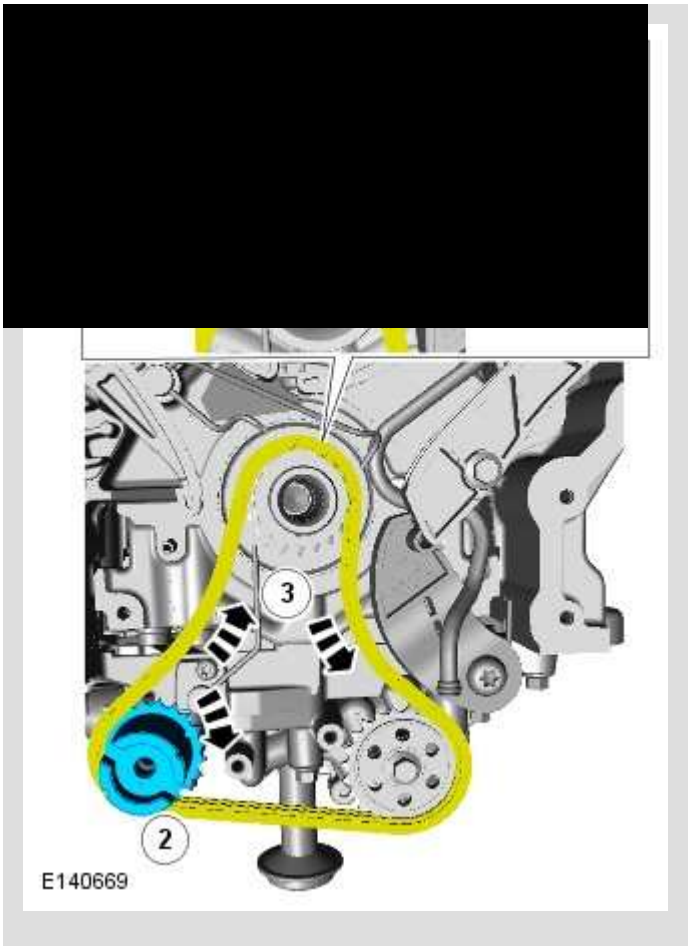
6.

cardiagn.com

CAUTIONS:

Using a suitable tie strap, position the tensioner to one side.

Take extra care when removing the component. Make sure the washers fitted both sides of the balance weight do not fall into the engine oil pan.



Make sure the coloured chain links align correctly with the fuel rail high-pressure fuel pumps camshaft, balance shaft and crankshaft sprocket markings.

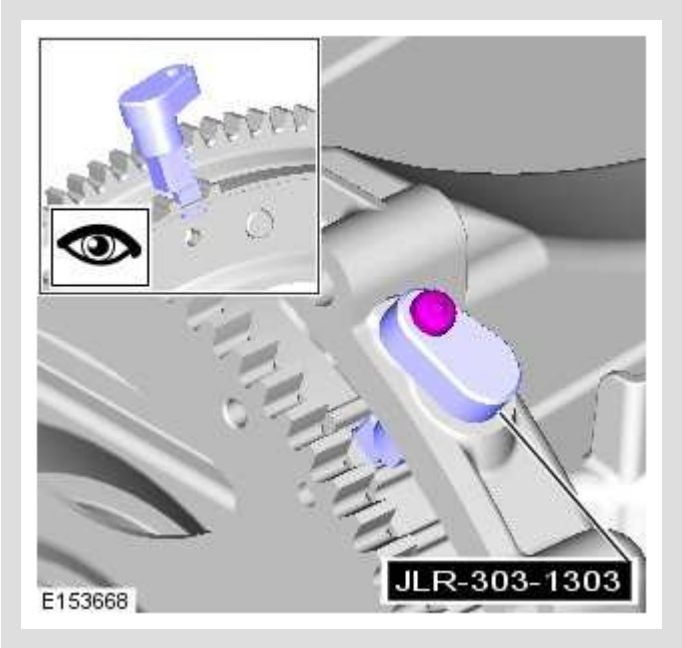
Special Tool(s): JLR-303-1621

Torque:

Stage 1: **25 Nm**

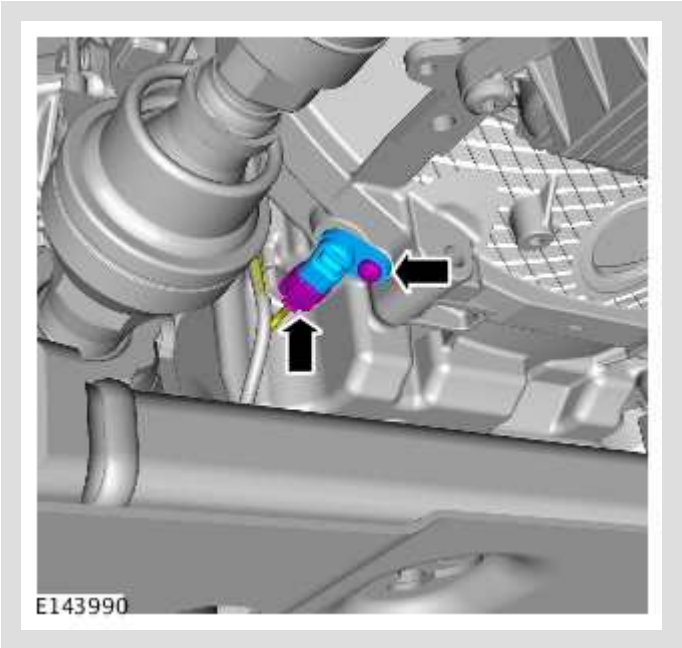
cardiagn.com

7. Stage 2: **90°**Refer to: Lower Timing Cover (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

8. 

Remove the special tool.

Special Tool(s): JLR-303-1303

9. 

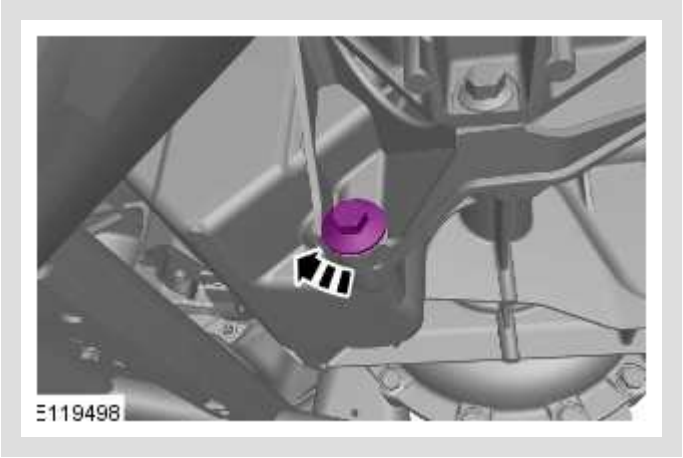
Torque: **10 Nm**

10.

cardiagn.com

NOTE:

Install a new sealing washer.



Torque: **24 Nm**

11. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

12.

1. Fill the engine with oil - for filling values on vehicles with supercharger:
Refer to: Specifications (303-01A Engine - V6 S/C 3.0L Petrol, Specifications).

   Clean any residual engine oil from the oil filler cap area.

13.

CAUTION:

Make sure that the vehicle has been left for 5 minutes from filling with oil.

Start the engine and allow to run for 10 minutes, stop the engine.

cardiagn.com

Check for leaks.

14.

CAUTIONS:

Make sure that the selector lever is in the park (P) position.

Make sure that the hood is open.

Set the ignition to the ON position.

15.

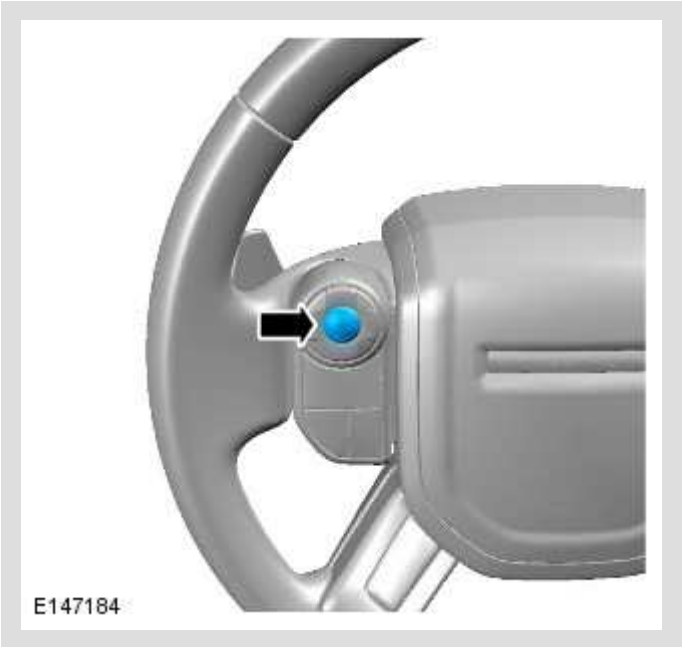
1. Press the left-hand OK button to access the Instrument Cluster (IC) Main Menu.

16.

cardiagn.com

Press the left-hand directional button and select Service Menu.

17.



Press the left-hand OK button.

cardiagn.com

18.

Press the left-hand directional button and select the Oil Level display.

19.

cardiagn.com

Press the left-hand OK button to access the Oil Level display.

cardiagn.com

CAUTION:

Make sure that the hood is open.

Press the speed control cancel button twice within 2 seconds while being on the oil level display.

21.

The message center displays the actual oil level in service mode.

cardiagn.com

Only after having started and run the engine for 15 minutes (as indicated in Step 13), switch off the engine, then stabilizing for 10 minutes, take a reading from the oil level display and, if necessary top up with engine oil.

22. Set the ignition to the OFF position.

23. Allow 10 minutes for the engine oil level to stabilize if there has been additional oil top up.

NOTE:

The following steps are to update the average oil level value.

24. Repeat step 14 to 20 to access the oil level display in service mode.

25.

NOTE:

The actual volume displayed on the bar graph will be written into the electronic control unit as a new value.

cardiagn.com

1. Press and hold the speed control cancel button for more than 5 seconds.

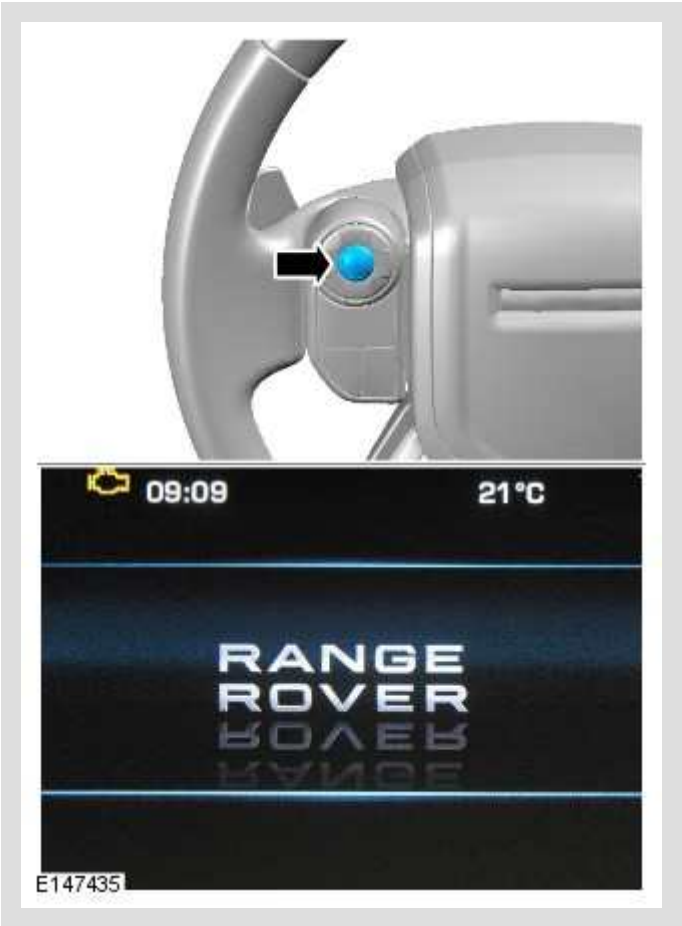
   The message center display the current oil level.

26. Set the ignition to the OFF position.

27. Set the ignition to the ON position.

cardiagn.com

28.



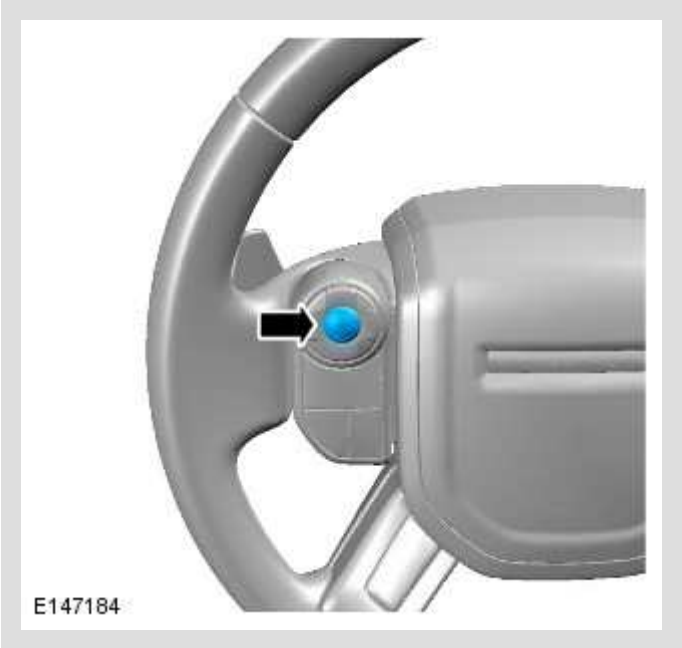
1. Press the left-hand OK button to access the Instrument Cluster (IC) Main Menu.

29.

cardiagn.com

Press the left-hand directional button and select Service Menu.

cardiagn.com



Press the left-hand OK button.

31.

Press the left-hand directional button and select the Oil Level display.

cardiagn.com

32.

Press the left-hand OK button and follow the instructions.

NOTE:

If the message shows "Not available" wait for further 10 mins to allow the oil level to stabilize.

Make sure that the average oil level value has now been updated.

NOTE:

The following steps are to update the average oil level value.

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

FUEL PUMP CAMSHAFT TIMING CHECK (G1588182)

GENERAL PROCEDURES

19.90.16	HIGH PRESSURE FUEL TIMING CHECK	3000 CC, AJ V6 (AJ126)	0.7	USED WITHINS	

SPECIAL TOOL(S)

JLR-303-1303

Timing Tool

cardiagn.com

E140377	**JLR-303-1621** Alignment Tool, Fuel Pump Camshaft Timing

CHECK

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

3. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

4.

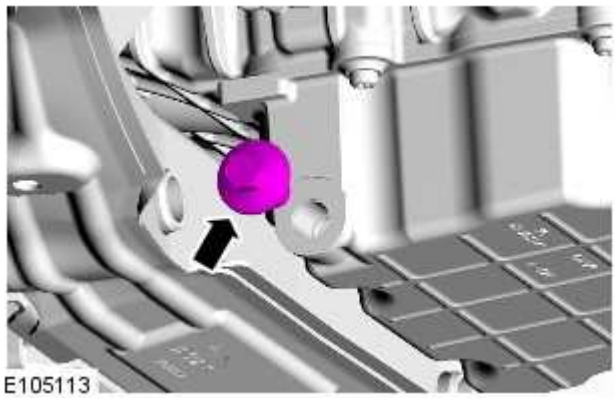
cardiagn.com

CAUTION:

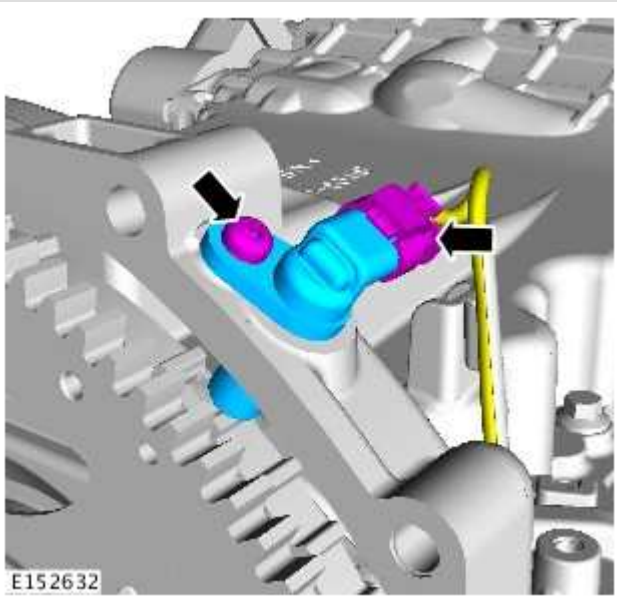
Be prepared to collect escaping oil.

NOTES:

- Discard the sealing washer.
- Collect the engine oil in a clean container.



5.

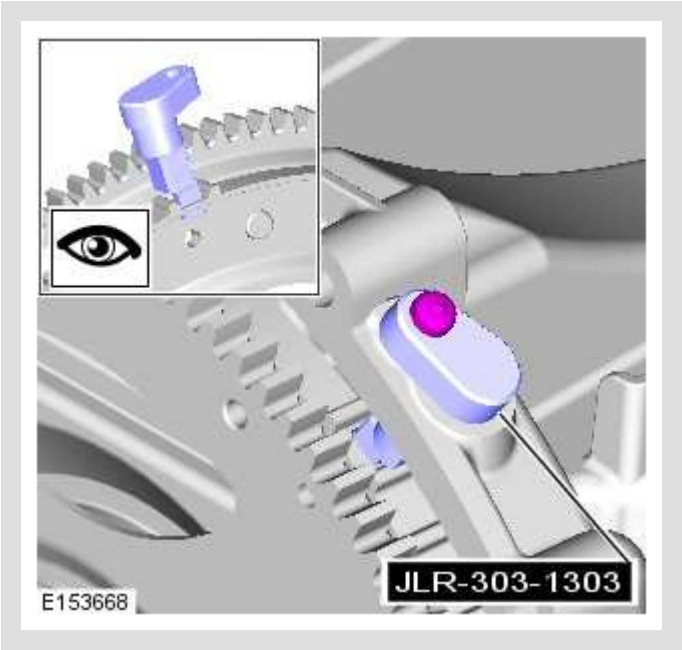


6.

cardiagn.com

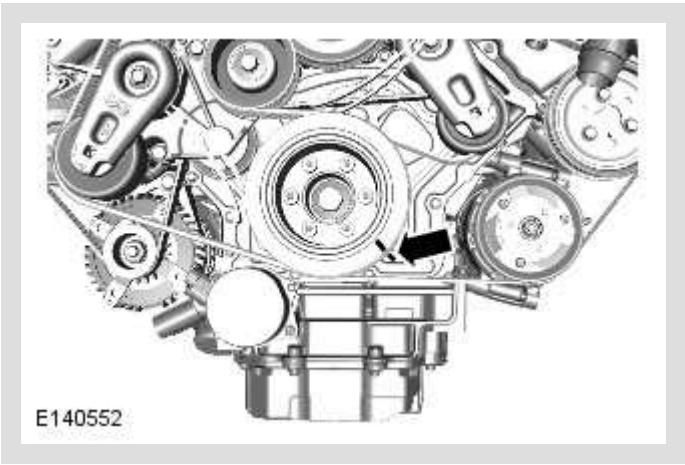
CAUTIONS:

- Only rotate the crankshaft clockwise.
- Make sure that the crankshaft is fully locked.



Special Tool(s): JLR-303-1303

7.



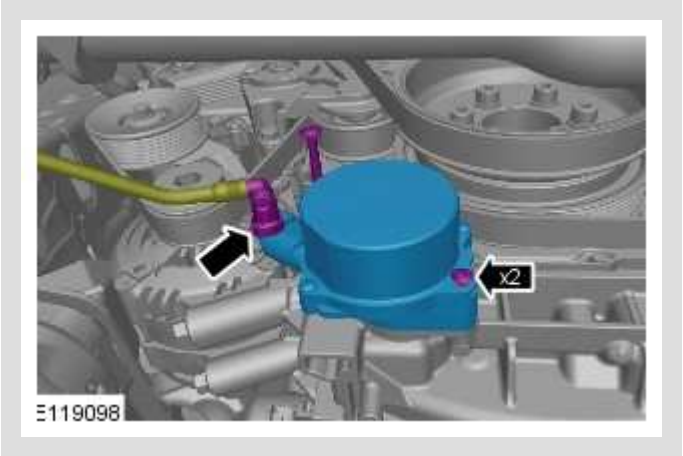
Using a suitable marker, mark the position of the crankshaft pulley as illustrated.

8.

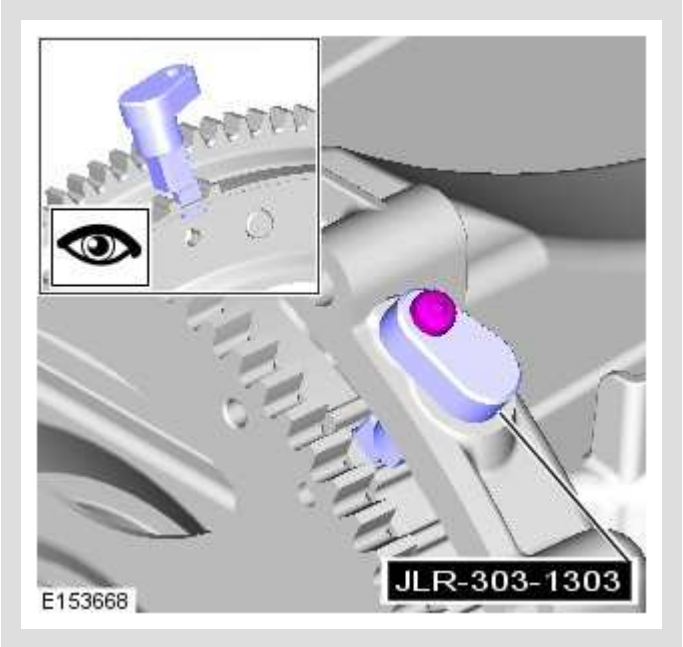
cardiagn.com

CAUTION:

Discard the seal.



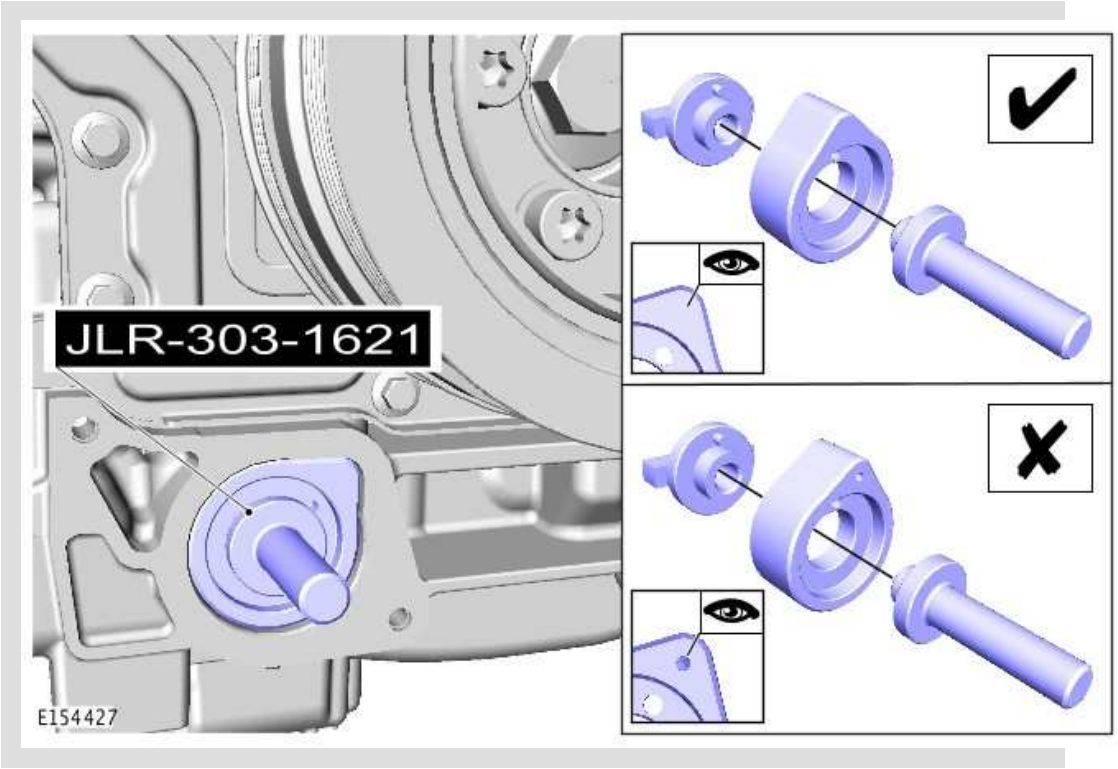
9.



Special Tool(s): JLR-303-1303

10.

cardiagn.com



If required, carefully adjust the crankshaft position to allow correct installation of the special tool.
Special Tool(s): JLR-303-1621

11.

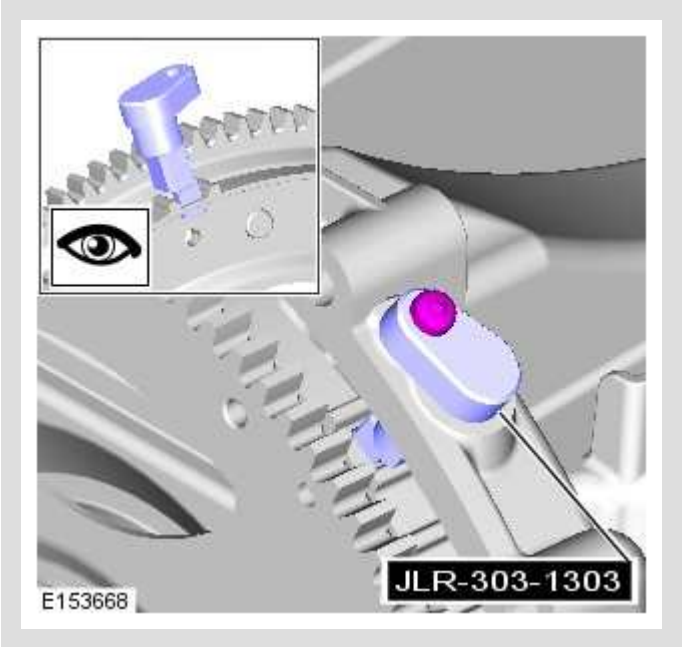
CAUTION:

Do not use excessive force when adjusting the crankshaft position.

cardiagn.com

NOTE:

If the crankshaft timing tool cannot be installed, adjustment of the fuel pump camshaft timing will be required.



If required, carefully adjust the crankshaft position to allow correct installation of the special tool.
Special Tool(s): JLR-303-1303

If the crankshaft timing tool cannot be installed, adjustment of the fuel pump camshaft timing will be required.

12.

cardiagn.com

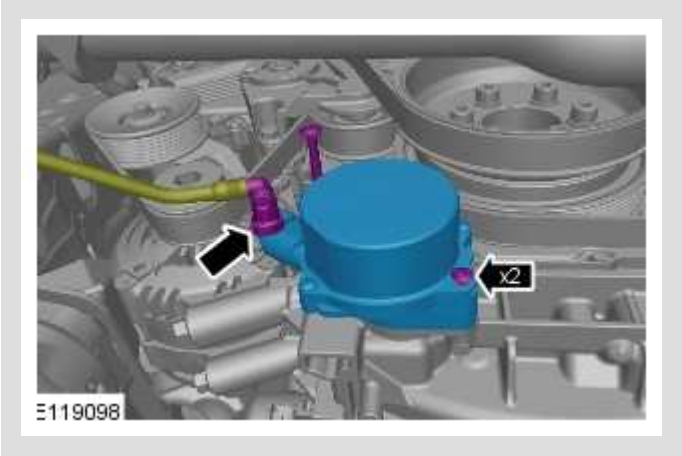
Special Tool(s): JLR-303-1621

13.

CAUTION:

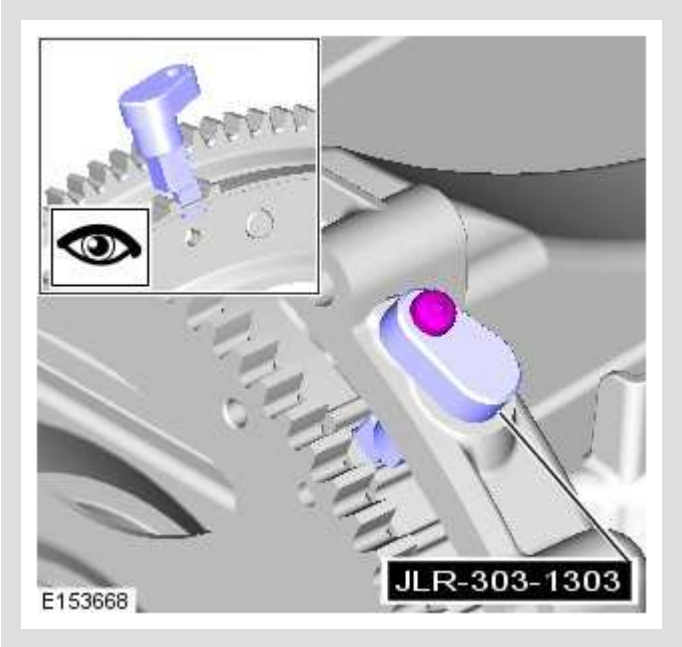
Install a new seal.

cardiagn.com



Torque: **12 Nm**

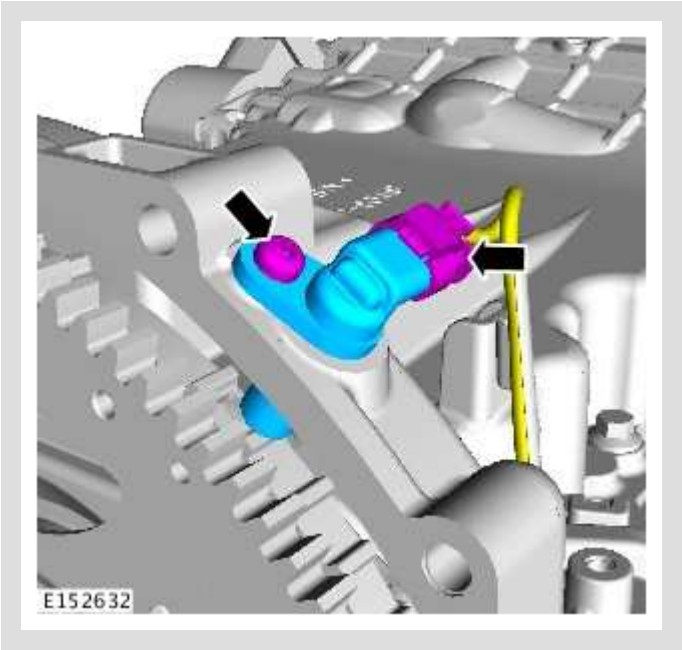
14.



Special Tool(s): JLR-303-1303

15.

cardiagn.com

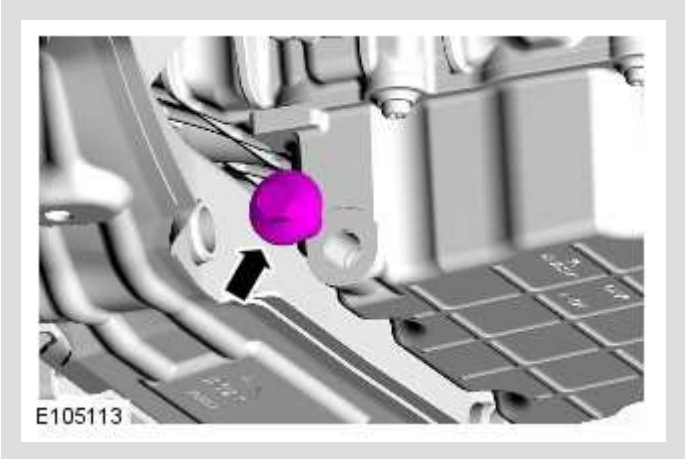


Torque: **10 Nm**

16.

NOTE:

Install a new sealing washer.



Torque: **24 Nm**

17. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

18.

cardiagn.com

CAUTION:

Make sure that the vehicle is left for 5 minutes from filling with oil and that the engine oil level is reading at least minimum, before starting the engine. To check engine oil level follow steps 22-26.

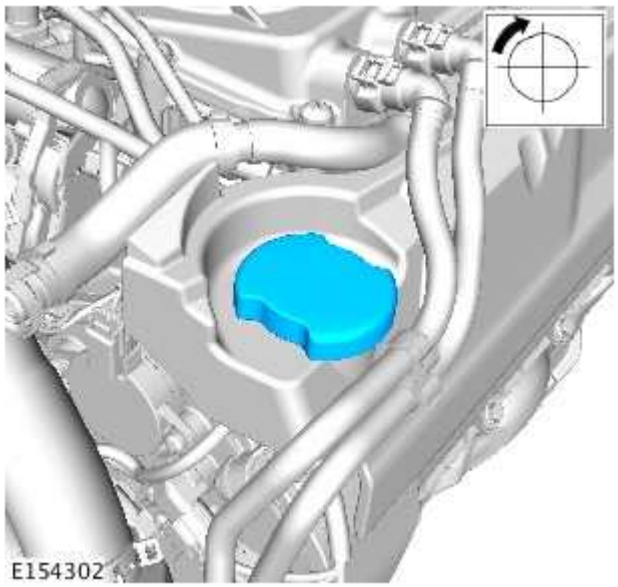
Fill the engine with oil.

Clean any residual engine oil from the oil filler cap area.
Refer to: Specifications (303-01 Engine - V6 S/C 3.0L Petrol, Specifications).

19.

CAUTION:

Correct installation of the oil filler cap can be obtained by tightening the cap until hard stop.



20.

cardiagn.com

CAUTION:

Make sure that the vehicle has been left for 5 minutes from filling with oil.

Follow the Steps 22-26 before starting the engine.

21.

Start the engine and allow to run for 10 minutes, stop the engine.

Check for leaks.

22.

CAUTIONS:

Make sure that the vehicle is parked on level ground.

Make sure that the selector lever and the gearshift mechanism are in the park (P) position.

Make sure that the hood is open.

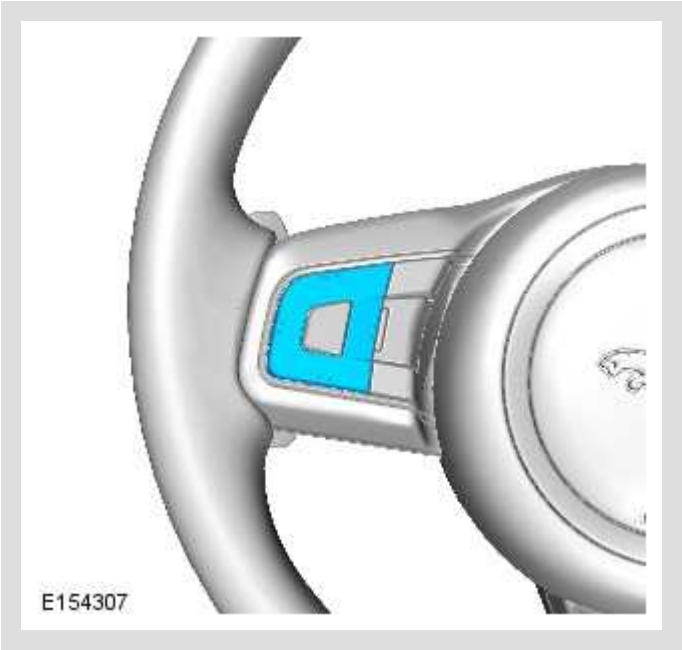
NOTE:

Allow 10 minutes from the engine switch off for the engine oil level to stabilize.

Turn the ignition on.

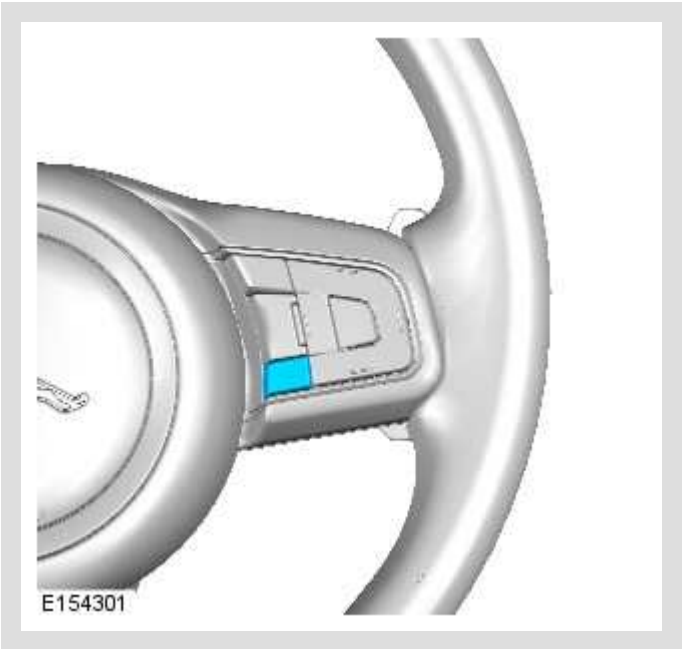
23.

cardiagn.com



Scroll through the message center to access the engine oil level display.

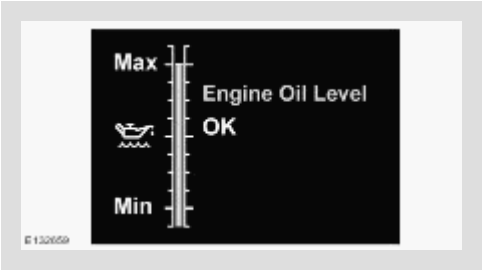
24.



Press the cruise control cancel button twice within 2 seconds.

25.

cardiagn.com



This display is now the live reading of the engine oil level.

Take a reading from the level display and, if necessary, top up with oil as instructed.

26. **NOTE:**

If instructed to follow Steps 22-26 in a previous step, return to Step 20 and continue the procedure.

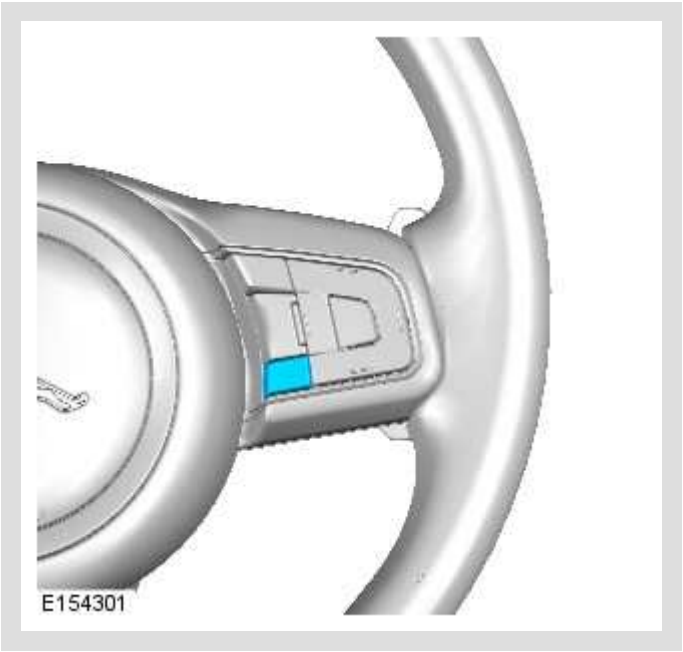
Turn the ignition off.

27. Allow 10 minutes for the engine oil level to stabilize if there has been additional oil top up.

28. **NOTE:**

The following steps are to update the average oil level value.

cardiagn.com



Turn the ignition on.

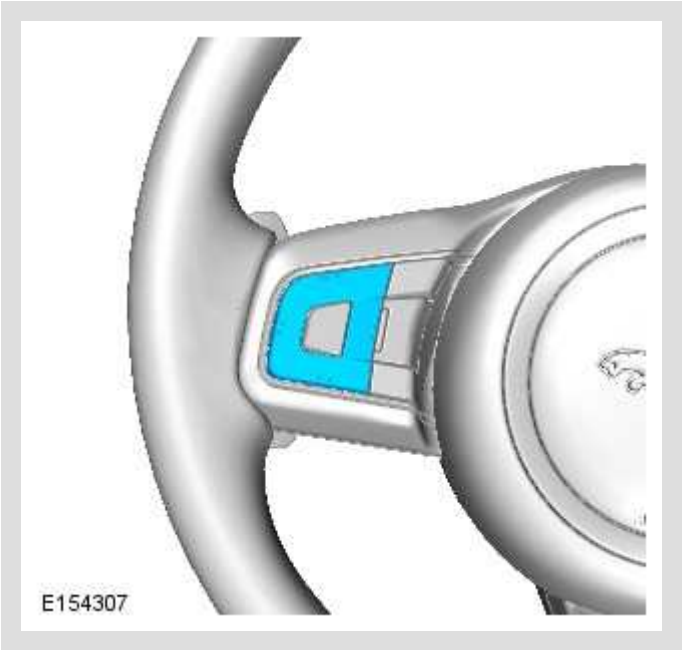
Press and hold the cruise control cancel button for more than 5 seconds.

29. Turn the ignition off.

30. Turn the ignition on.

31.

cardiagn.com



Scroll through the trip menu to access the engine oil level display.

Make sure that the average oil level value has now been updated.

32. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

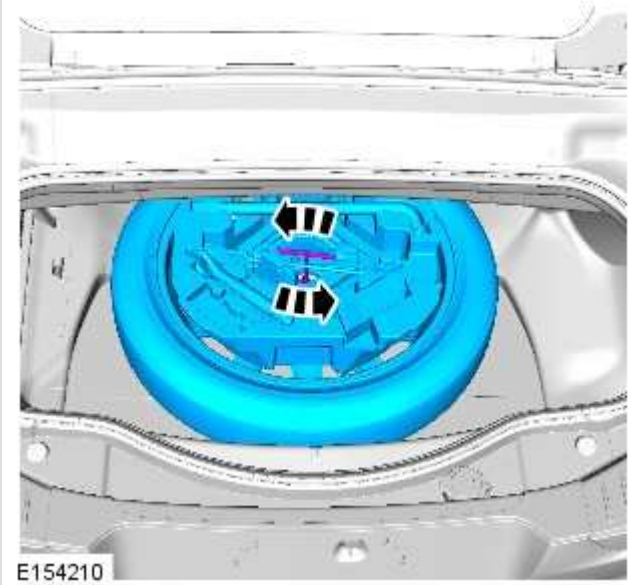
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

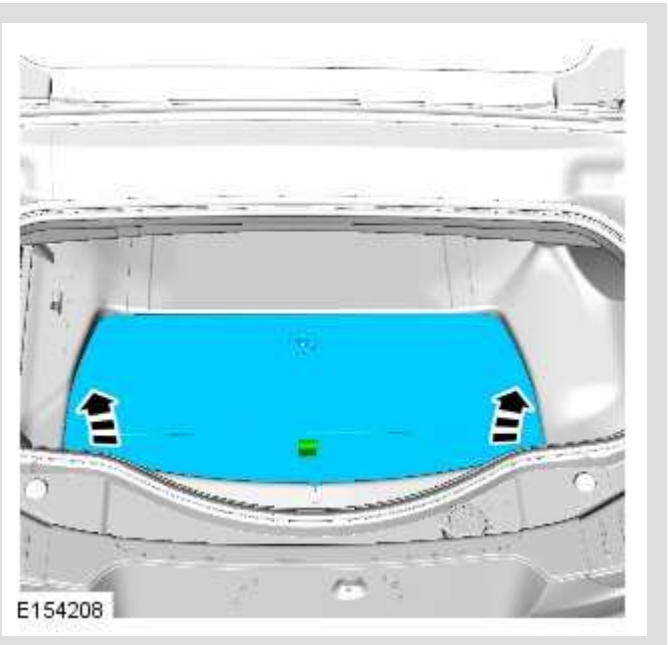
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

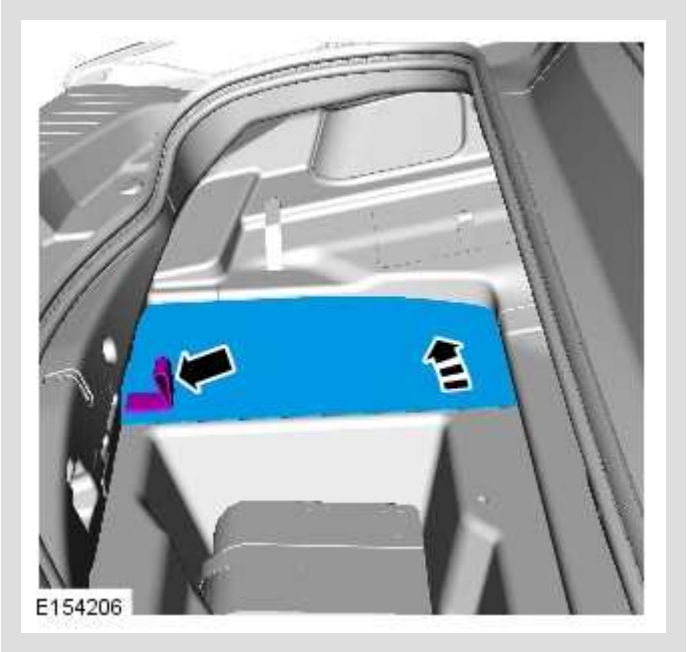

E154210

4.


E154208

5.

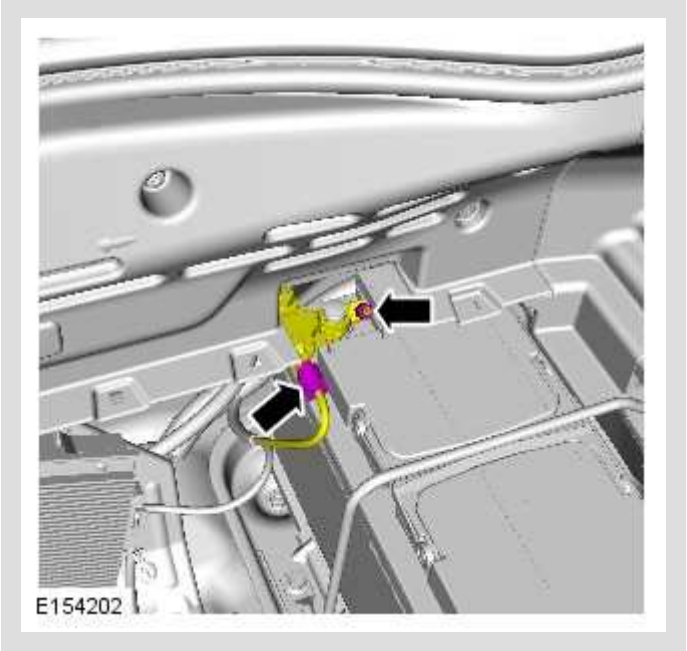
cardiagn.com



6.

CAUTION:

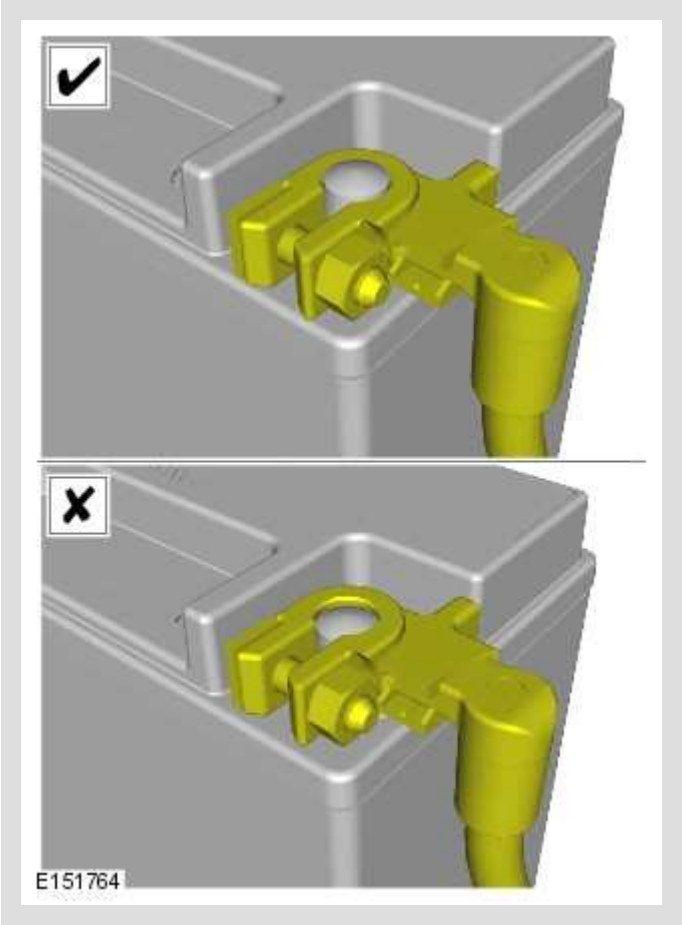
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

ENGINE - V6 S/C 3.0L PETROL

LOWER TIMING COVER (G1584124)

REMOVAL AND INSTALLATION

12.66.03	TIMING COVER - LOWER - RENEW	ALL DERIVATIVES	4.9	USED WITHINS	

SPECIAL TOOL(S)

303-1433

Lower Timing Cover Alignment tool

cardiagn.com

REMOVAL

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

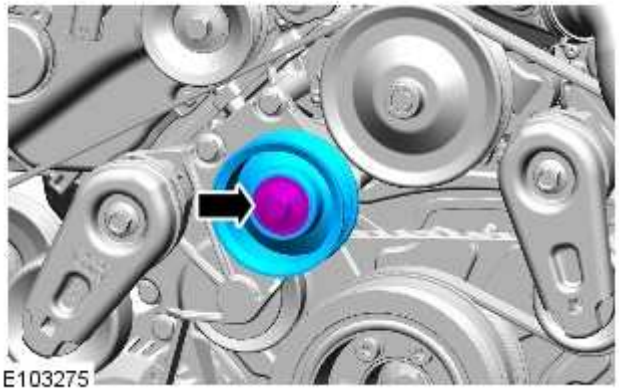
   Raise and support the vehicle.

3. Refer to: Crankshaft Pulley (303-01 Engine - V8 S/C 5.0L Petrol, Removal and Installation).

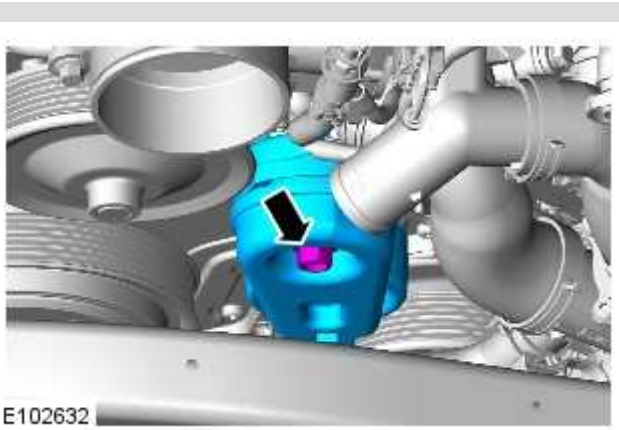
4.

5.

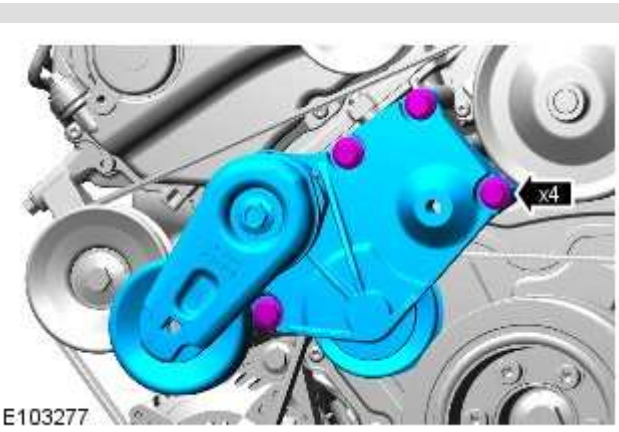
cardiagn.com



6.



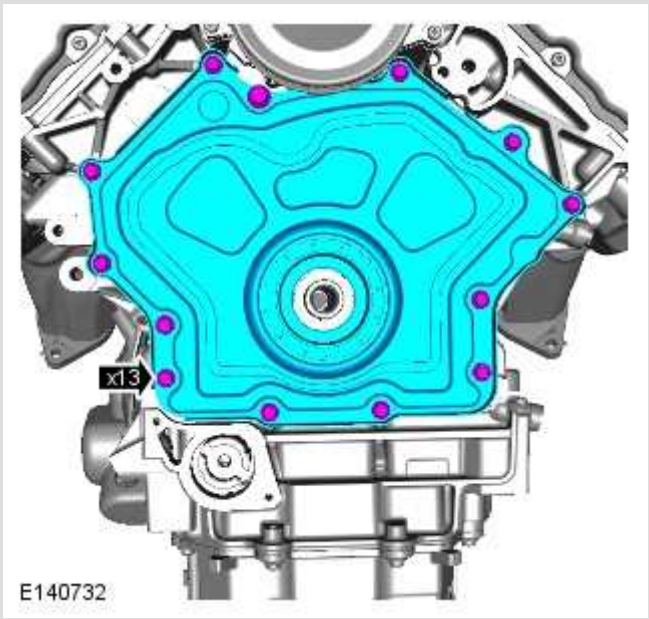
7.



cardiagn.com

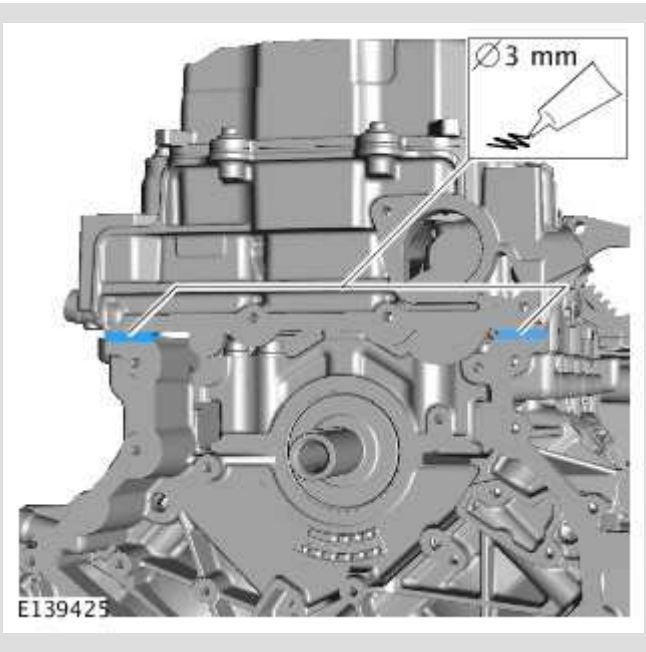
8. Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

9.



INSTALLATION

1.



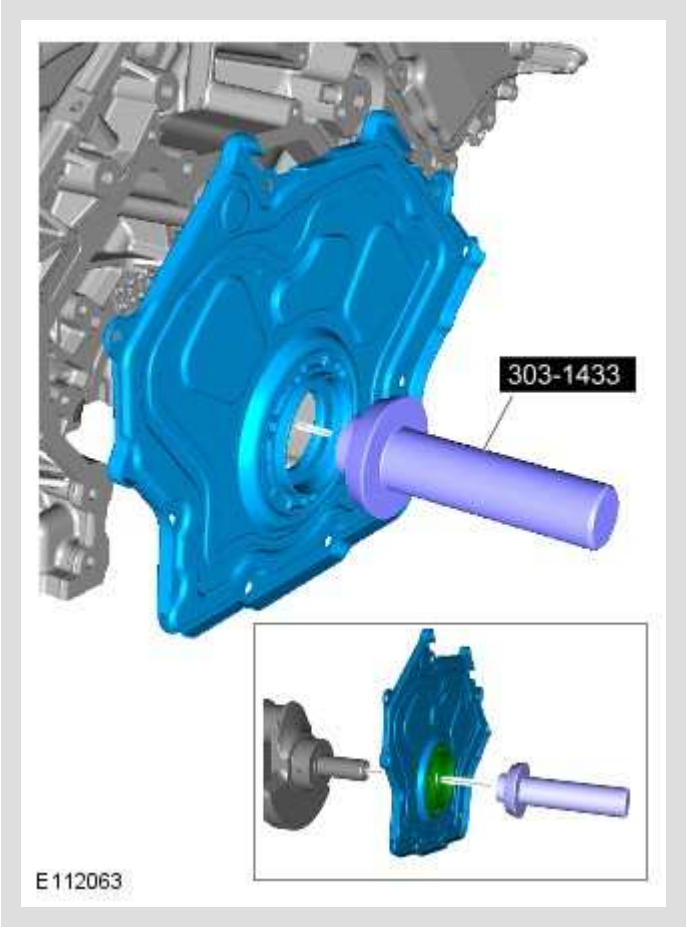
Apply RTV sealant WSE-M4G323-A6 (Loctite 5901G or Loctite 5900) to the areas shown, and tighten the bolts within 7 minutes.

2.

cardiagn.com

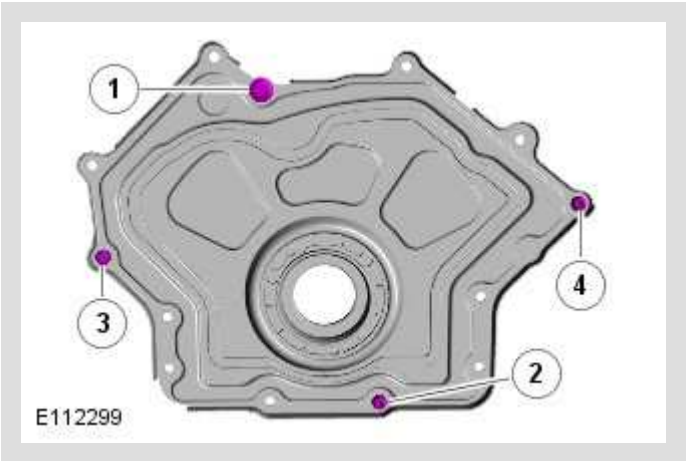
CAUTION:

Make sure that the mating faces are clean and free of foreign material.



Install the bolts, but do not tighten fully at this stage.
Special Tool(s): 303-1433

3.



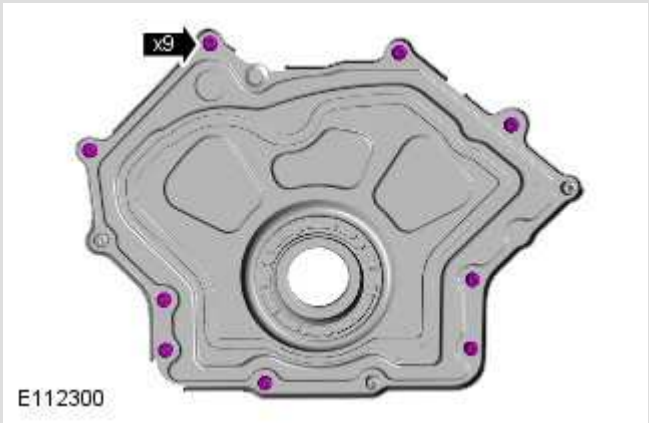
Torque:

cardiagn.com

M6 **12 Nm**

M8 **20 Nm**

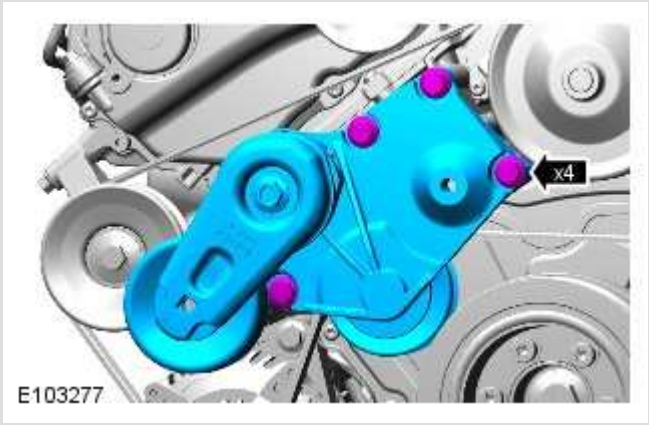
4.



Torque: **12 Nm**

5. Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

6.



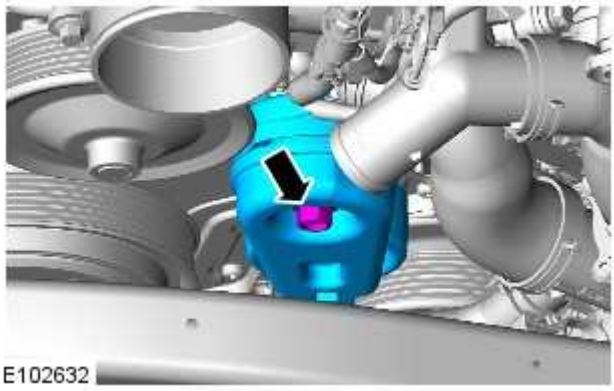
Torque: **25 Nm**

7.

CAUTION:

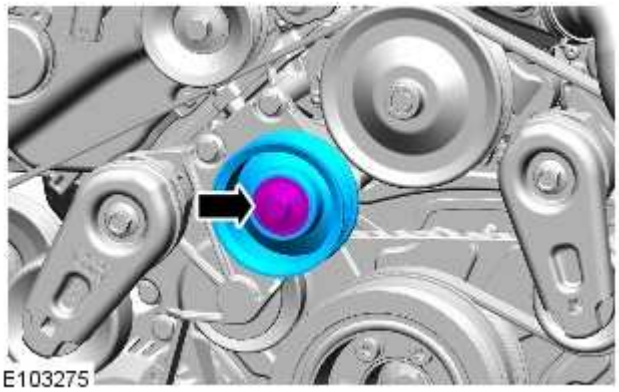
Install all the bolts finger tight before final tightening.

cardiagn.com



Torque: **40 Nm**

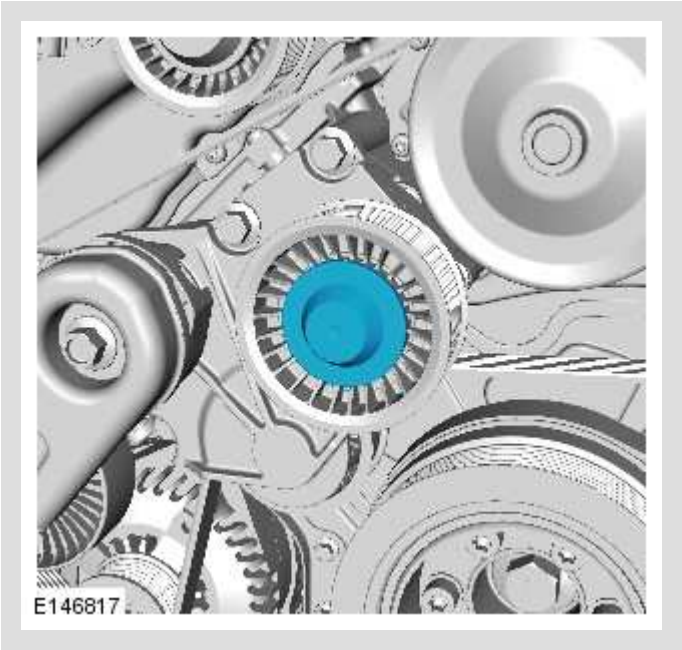
8.



Torque: **40 Nm**

9.

cardiagn.com



10. Refer to: Crankshaft Pulley (303-01 Engine - V8 S/C 5.0L Petrol, Removal and Installation).

11. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

SPECIFICATIONS

Engine Data

ENGINE DESCRIPTION	ENGINE CAPACITY	MAXIMUM ENGINE TORQUE (EEC) (SAE)	MAXIMUM ENGINE POWER (EEC) (SAE)	COMPRESSION RATIO	BORE	STROKE
• 90° "Vee" • 6 Cylinder • 24 Valves	2.995 ccm	450 Nm at 3.500 - 5.000 RPM	250 kW at 6.500 RPM	10.5 ± 0.50	84.5 ± 0.000 mm	89 ± 0.0 mm

Engine Firing Order

FIRING ORDER
1:4:2:5:3:6

Engine Valve Clearance (cold)

INTAKE VALVE (MM)	EXHAUST VALVE (MM)
0.18 - 0.22	0.23 - 0.27

Spark Plugs

SPECIFICATION	SPARK PLUG GAP
SILZKAR7C-10S	0.9 - 1.0 mm

Lubricants, Fluids, Sealers and Adhesives

cardiagn.com

NOTE:

When servicing or draining the engine oil, the 0w20 oil is compatible with 5w20. Any residue mix is acceptable.

DESCRIPTION	SPECIFICATION
Engine Oil - Vehicles built up to 2015	SAE 5W20 WSS-M2C925-A **or** SAE 0W20 STJLR.51.5122
Engine Oil - Vehicles built from 2015	SAE 0W20 STJLR.51.5122
Sealant	WSE-M4G323-A6
Core plug and stub pipe retainer	WSK-M2G349-A7
Jaguar Premium Cooling System Fluid	WSS-M97B44-D

Capacities

DESCRIPTION	LITRES
Engine oil, initial fill	8.75
Engine oil, service fill with oil filter change	7.25
Engine oil, service fill without oil filter change	6.75

Cylinder Head and Valve Train

ITEM	SPECIFICATION
Cylinder head **maximum** permitted warp (flatness specification)	0.2 mm (0.008 in)
Valve guide inner diameter (mm)	5.51 ± 0.01
Intake valve effective length (mm) (tip to gauge line)	117.58 ± 0.10
Exhaust valve effective length (mm) (tip to gauge line)	94.75 ± 0.10
Valve stem to guide clearance intake diametrical (mm)	0.042 - 0.057
Valve stem to guide clearance exhaust diametrical (mm)	0.060 - 0.075

cardiagn.com

Valve head diameter intake (mm)	31.6-Overall diameter-33 ± 0.10
Valve head diameter exhaust (mm)	26-Overall diameter-28 ± 0.10
Intake valve face angle (degrees)	44.875 ± 0.125
Exhaust valve face angle (degrees)	44° 52' 30" ± 7' 30"
Valve stem diameter intake (mm)	5.4705 ± 0.0075
Valve stem diameter exhaust (mm)	5.4525 ± 0.0075
Valve spring free length (mm) - inlet	46.1
Valve spring free length (mm) - exhaust	46.1
Valve spring installed height (mm) - inlet	36.78
Valve spring installed height (mm) - exhaust	37.07
Camshaft lobe lift intake (mm)	10
Camshaft lobe lift exhaust (mm)	9.36
Camshaft journal to cylinder head bearing surface clearance diametrical (mm)	0.025 - 0.065
Camshaft journal diameter - all positions	26.965 ± 0.01
Bearing diameter - all positions	27.01 ± 0.01
Camshaft journal maximum run out limit (mm)	
Camshaft journals to end journals	0.03
Camshaft journals to adjacent journals	0.015
Camshaft journal maximum out of round (mm) - all journals	0.005
Crankshaft end play (mm)	0.15 - 0.35

Crankshaft Pin and Bearing

NOTE:

Make sure that the crankshaft pin journal classification number is noted correctly, so that the correct bearing is installed.

cardiagn.com

CRANKSHAFT PIN DIAMETER BEARING SIZE (MM)	CRANKSHAFT PIN LETTER
55.982 - 55.988	A - G
55.989 - 55.994	H - N
55.995 - 56.000	P - W
Crankshaft Pin Letter	**Color**
A - G	Brown/Yellow (Part Number - DX23-6211-BFA)
H - N	Brown/Red (Part Number - DX23-6211-BEA)
P - W	Brown/Blue (Part Number - DX23-6211-BDA)

Torque Specification

NOTE:

A = Refer to procedure for correct torque sequence.

DESCRIPTION	NM	LB-FT	LB-IN
Engine cover mounting bolts	10	7	88
Accessory drive belt tensioner retaining bolt	40	30	354
Supercharger belt idler/tensioner bracket retaining bolts	25	18	221
Secondary drive belt idler retaining bolts	40	30	354
Power steering pump pulley retaining bolts	25	18	221
Power steering pump retaining bolts	25	18	221
Power steering pump bracket to engine retaining bolts	25	18	221
Generator retaining bolts	48	35	425
Starter motor retaining bolts	48	35	425

cardiagn.com

Air conditioning compressor retaining bolts	25	18	221
Engine mounting to engine mounting bracket retaining nuts	48	35	425
Engine mounting to subframe retaining nuts	63	46	558
Engine mounting bracket to engine retaining bolts	48	35	425
Crankshaft damper pulley retaining LH threaded bolt	200 + 270°	148 + 270°	1770 + 270°
Flexplate retaining bolts	45 + 90°	33 + 90°	398 + 90°
Exhaust manifold heat shield retaining bolts	A	-	-
Exhaust manifold retaining bolts	A	-	-
Engine wiring harness bracket retaining bolts	10	7	88
Coolant outlet pipe	10	7	88
Intercooler retaining bolts	25	18	221
Intake manifold retaining bolts	25	18	221
Oil Cooler retaining bolts	13	10	115
Knock sensor (KS) retaining bolt	20	14	177
Ignition coil retaining bolts	8	-	71
Spark plugs	20	15	177
Fuel rail retaining bolts	A	-	-
High pressure fuel pipe retaining bolts	A	-	-
High pressure fuel pump retaining bolts	12	9	106
Oil filter housing assembly retaining bolts	12	9	106
Oil filter cap	28	21	248
Lifting eye bolts	25 + 90°	18 + 90°	221 + 90°
Manifold absolute pressure and temperature (MAPT) sensor sensor retaining bolts	5	-	44
Coolant pump retaining bolts	12	9	106
Variable valve timing (VVT) oil control solenoid retaining bolts	10	7	88

cardiagn.com

Camshaft position (CMP) sensor retaining bolts	10	7	88
Camshaft cover retaining bolts	13	10	115
Front upper timing cover retaining bolts	12	9	106
Front lower timing cover retaining bolts	A	-	-
Engine rear cover retaining bolts	A	-	-
VVT to camshaft retaining bolts	32	24	283
Camshaft bearing caps retaining bolts	11	8	97
Primary timing chain fixed guide retaining bolts	12	9	106
Primary timing chain tensioner retaining bolts	12	9	106
Primary timing chain tensioner guide blade retaining bolts	25	18	221
Auxiliary chain tensioner guide retaining bolts	21	15	186
Auxiliary chain fixed guide retaining bolt	12	9	106
Oil pump sprocket retaining bolt	25	18	221
Cylinder head retaining bolts	A	-	-
Engine oil level (EOL) sensor retaining bolt	12	9	106
Oil pan to oil sump body retaining bolts	12	9	106
Oil sump body to engine retaining bolts	25	18	221
Oil pan drain plug	24	17	212
Oil transfer tube to Oil pan body retaining bolts	11	8	97
Oil pump to engine block retaining bolts	25	18	221
Pick-up pipe to oil pump retaining bolts	12	9	106
Windage tray retaining bolts	25	18	221
Piston cooling jet retaining bolts	12	9	106
Engine block coolant draining plug	50	37	442
Balance shaft assembly retaining bolts	25 + 90°	18 + 90°	221 + 90°-
Rear balance weight assembly retaining nuts	25 + 38°	18 + 38°	221 + 38°
Rear balance weight assembly chain bracket retaining bolt	25	18	221

cardiagn.com

Connecting rod bolts	20 + 125°	14 + 125°	177 + 125°

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

FUEL PUMP CAMSHAFT TIMING CHECK (G1588182)

GENERAL PROCEDURES

19.90.16	HIGH PRESSURE FUEL TIMING CHECK	3000 CC, AJ V6 (AJ126)	0.7	USED WITHINS	

SPECIAL TOOL(S)

JLR-303-1303

Timing Tool

cardiagn.com

E140377	**JLR-303-1621** Alignment Tool, Fuel Pump Camshaft Timing

CHECK

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

3. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

cardiagn.com

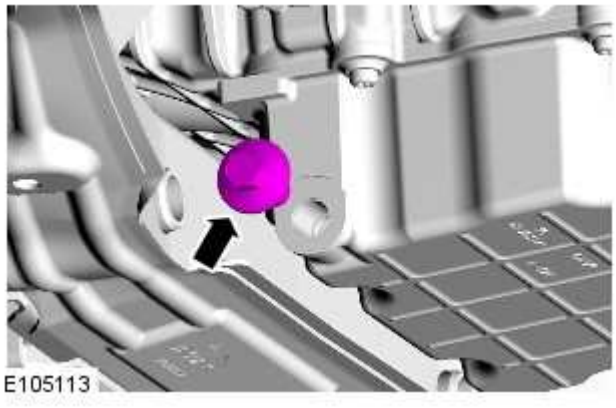
4.

CAUTION:

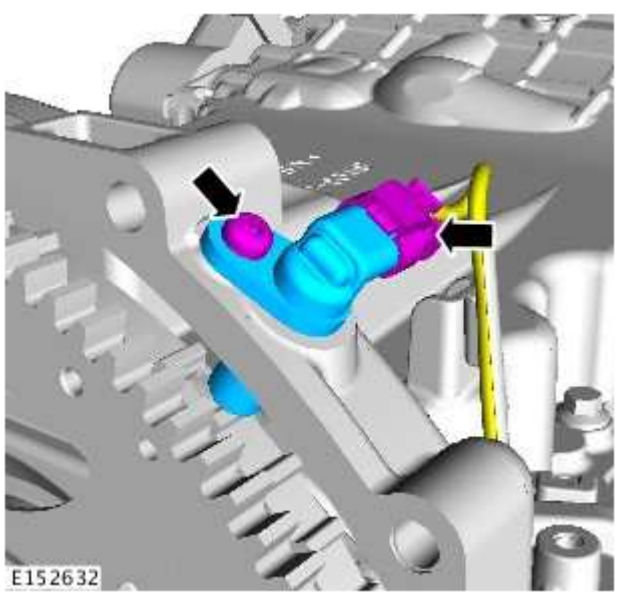
Be prepared to collect escaping oil.

NOTES:

- Discard the sealing washer.
- Collect the engine oil in a clean container.



5.

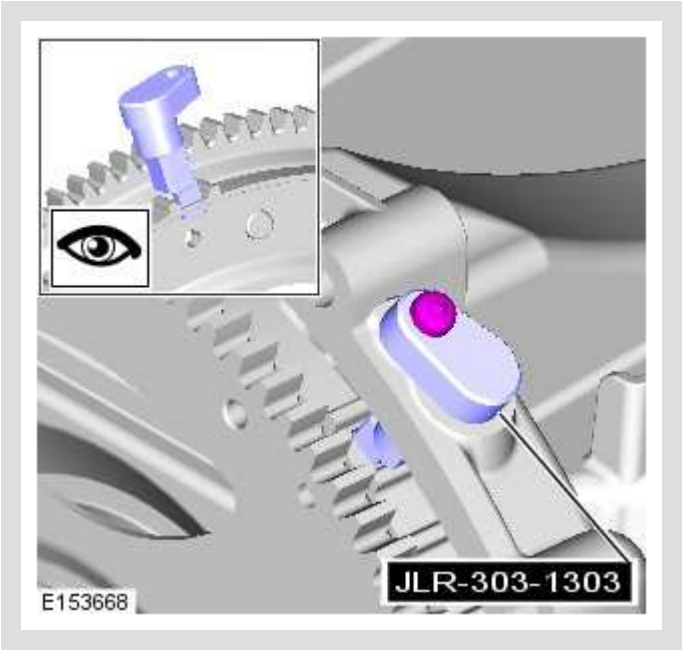


6.

cardiagn.com

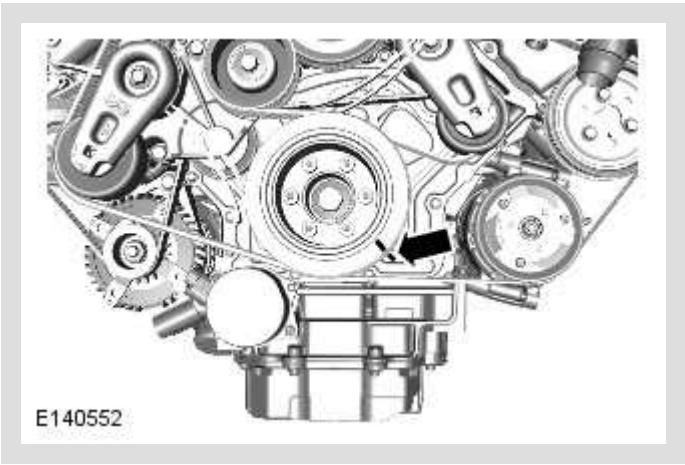
CAUTIONS:

- Only rotate the crankshaft clockwise.
- Make sure that the crankshaft is fully locked.



Special Tool(s): JLR-303-1303

7.



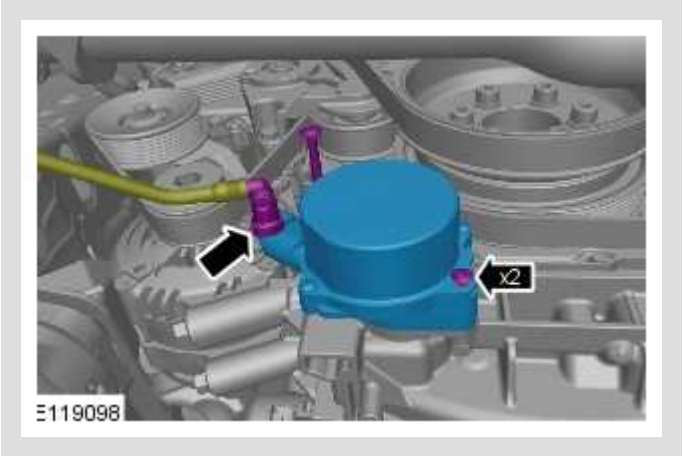
Using a suitable marker, mark the position of the crankshaft pulley as illustrated.

8.

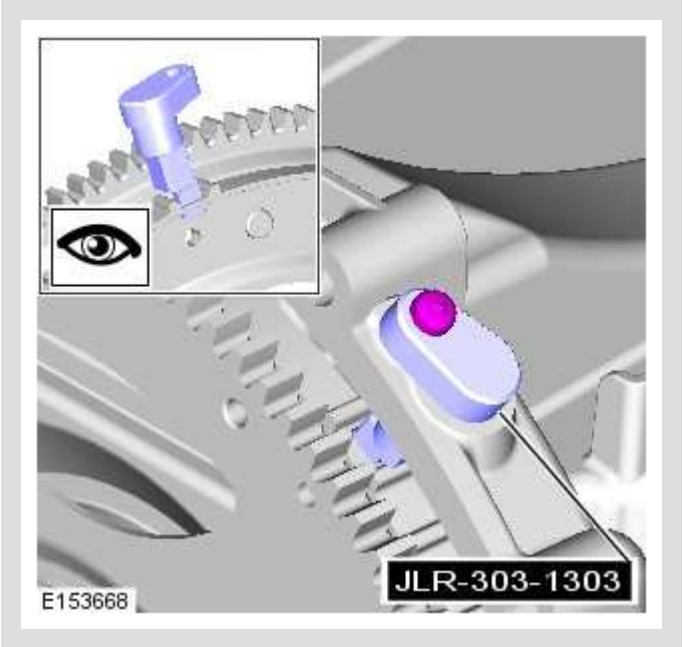
cardiagn.com

CAUTION:

Discard the seal.



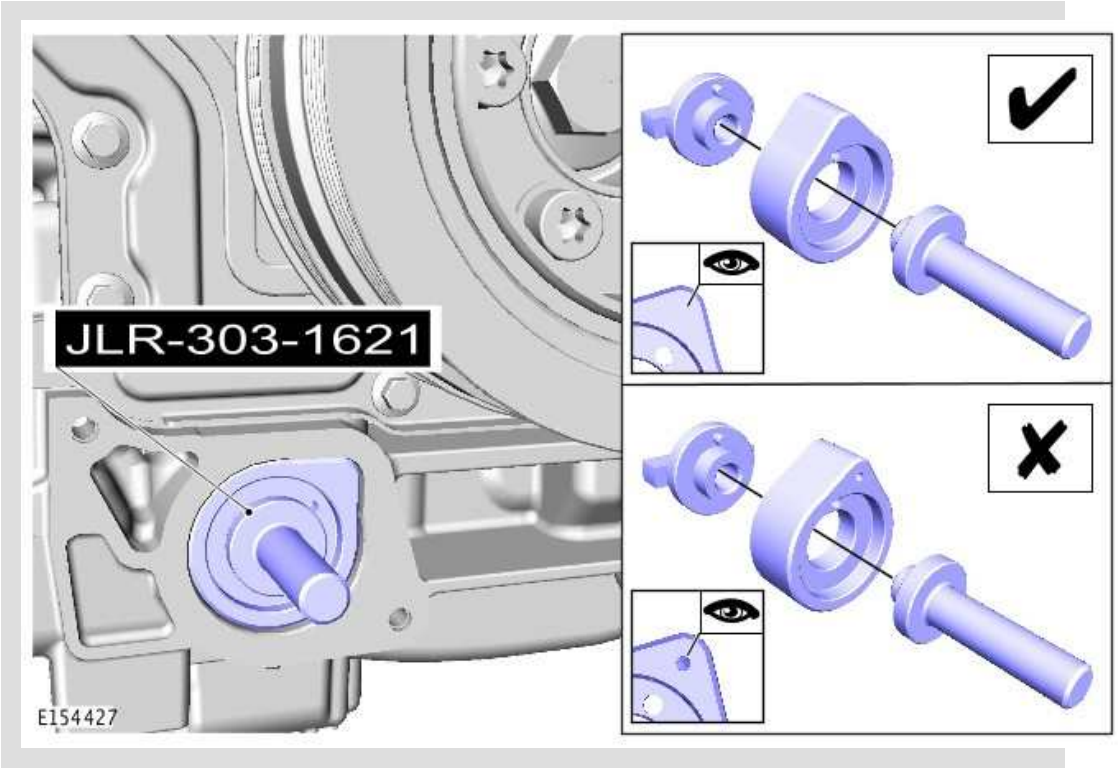
9.



Special Tool(s): JLR-303-1303

10.

cardiagn.com



If required, carefully adjust the crankshaft position to allow correct installation of the special tool.
Special Tool(s): JLR-303-1621

11.

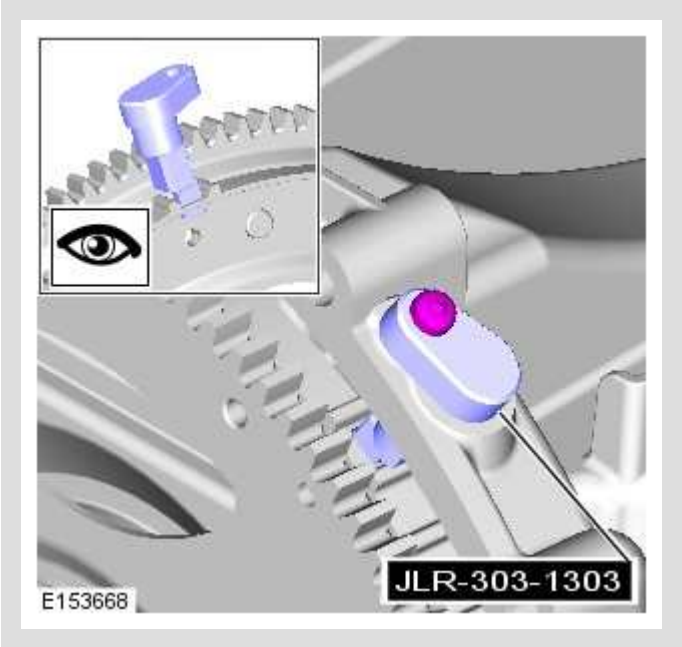
CAUTION:

Do not use excessive force when adjusting the crankshaft position.

cardiagn.com

NOTE:

If the crankshaft timing tool cannot be installed, adjustment of the fuel pump camshaft timing will be required.



If required, carefully adjust the crankshaft position to allow correct installation of the special tool.
Special Tool(s): JLR-303-1303

If the crankshaft timing tool cannot be installed, adjustment of the fuel pump camshaft timing will be required.

12.

cardiagn.com

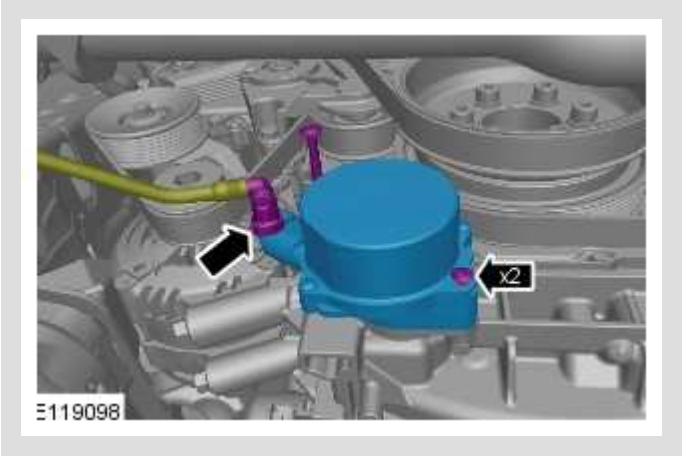
Special Tool(s): JLR-303-1621

13.

CAUTION:

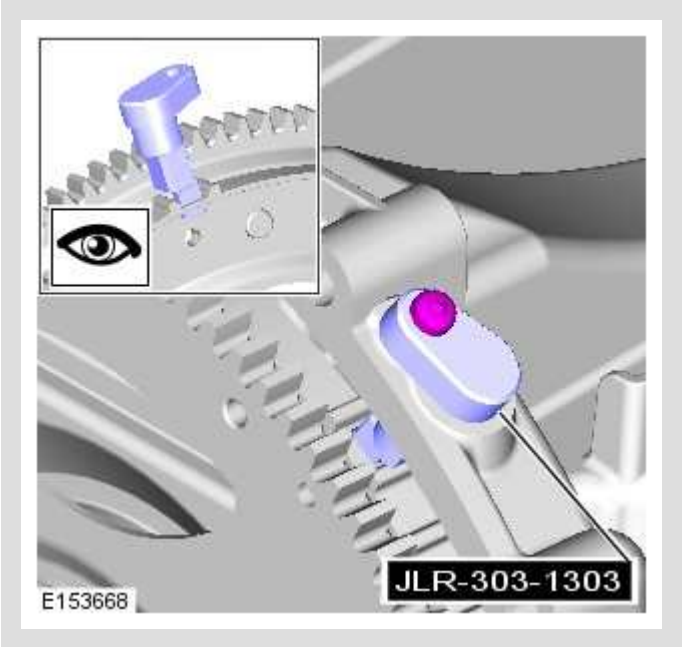
Install a new seal.

cardiagn.com



Torque: **12 Nm**

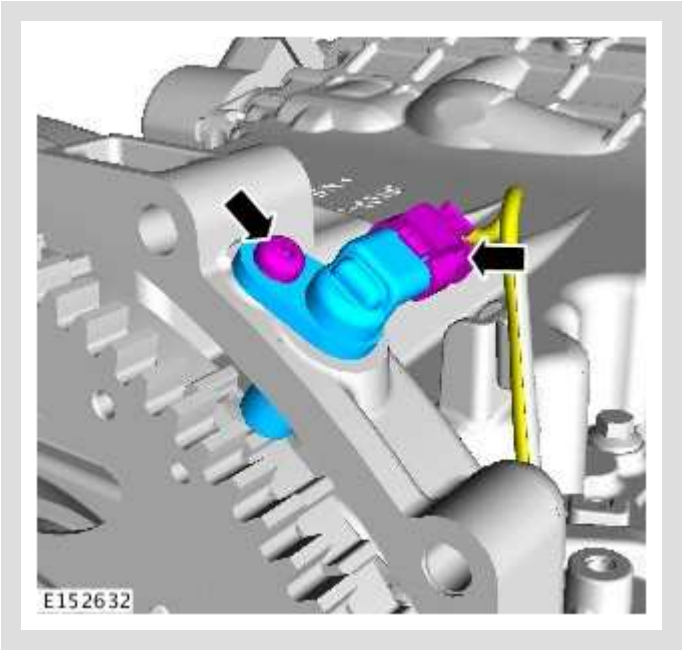
14.



Special Tool(s): JLR-303-1303

15.

cardiagn.com

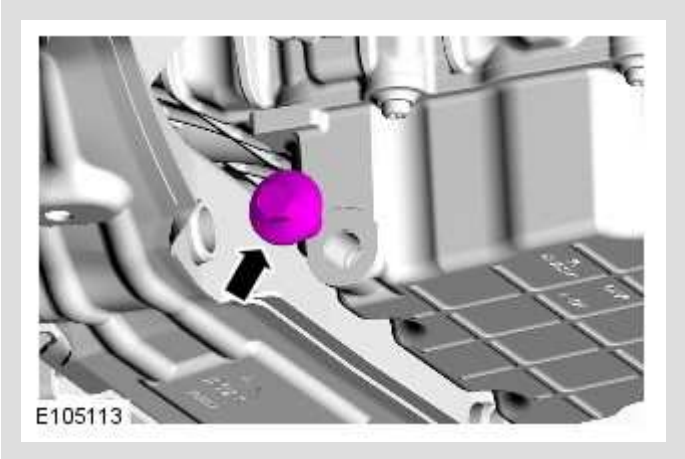


Torque: **10 Nm**

16.

NOTE:

Install a new sealing washer.



Torque: **24 Nm**

17. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

18.

cardiagn.com

CAUTION:

Make sure that the vehicle is left for 5 minutes from filling with oil and that the engine oil level is reading at least minimum, before starting the engine. To check engine oil level follow steps 22-26.

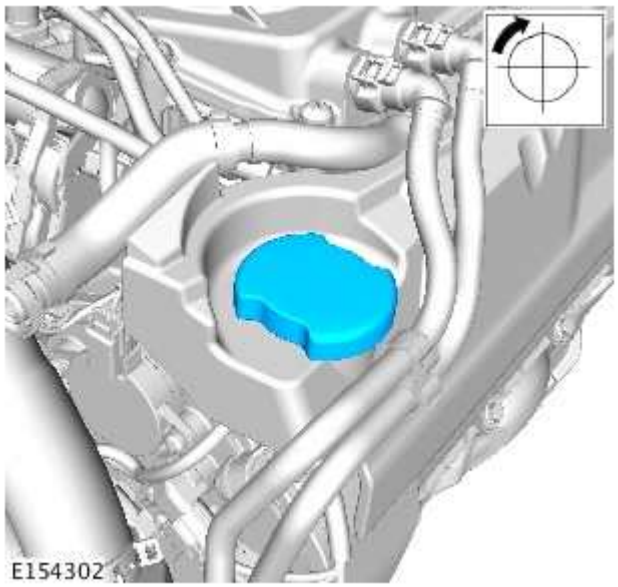
Fill the engine with oil.

Clean any residual engine oil from the oil filler cap area.
Refer to: Specifications (303-01 Engine - V6 S/C 3.0L Petrol, Specifications).

19.

CAUTION:

Correct installation of the oil filler cap can be obtained by tightening the cap until hard stop.



20.

cardiagn.com

CAUTION:

Make sure that the vehicle has been left for 5 minutes from filling with oil.

Follow the Steps 22-26 before starting the engine.

21.

Start the engine and allow to run for 10 minutes, stop the engine.

Check for leaks.

22.

CAUTIONS:

Make sure that the vehicle is parked on level ground.

Make sure that the selector lever and the gearshift mechanism are in the park (P) position.

Make sure that the hood is open.

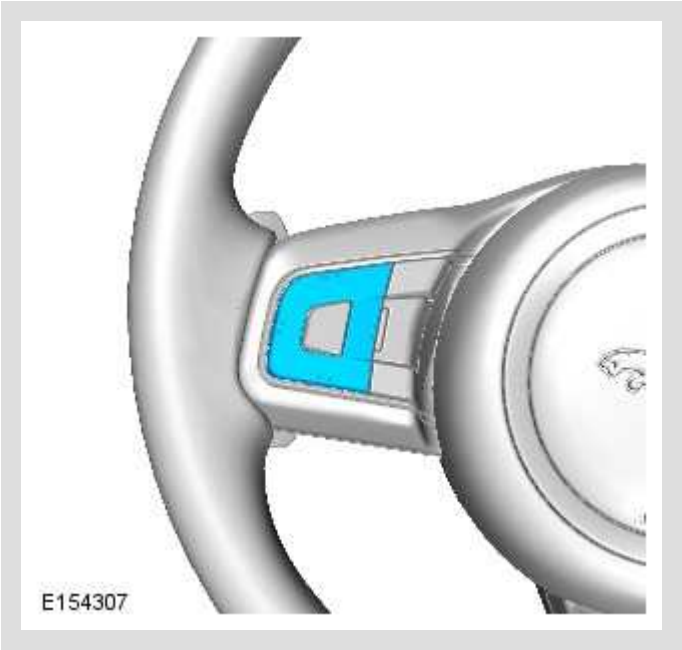
NOTE:

Allow 10 minutes from the engine switch off for the engine oil level to stabilize.

Turn the ignition on.

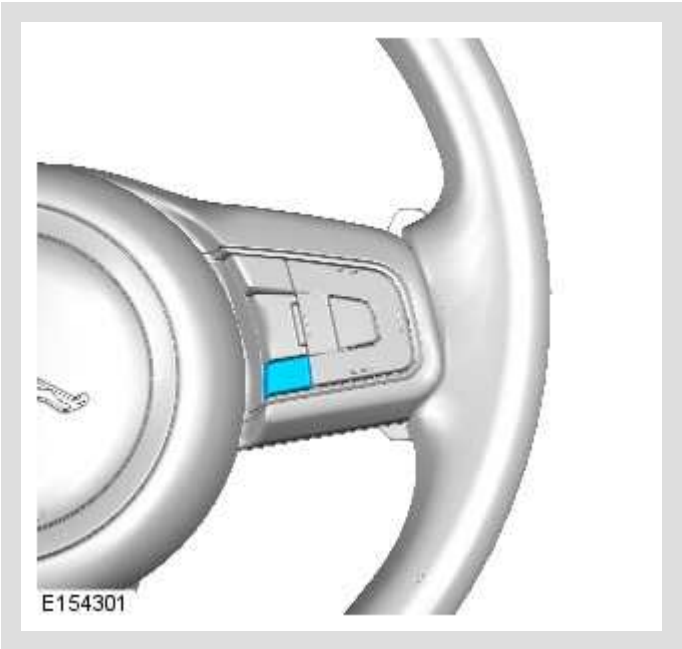
23.

cardiagn.com



Scroll through the message center to access the engine oil level display.

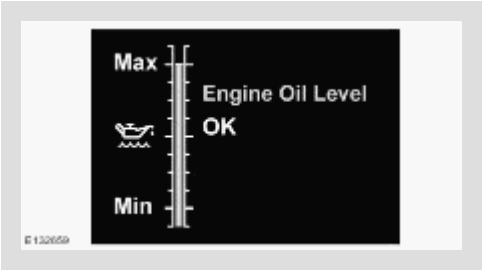
24.



Press the cruise control cancel button twice within 2 seconds.

25.

cardiagn.com



This display is now the live reading of the engine oil level.

Take a reading from the level display and, if necessary, top up with oil as instructed.

26. **NOTE:**

If instructed to follow Steps 22-26 in a previous step, return to Step 20 and continue the procedure.

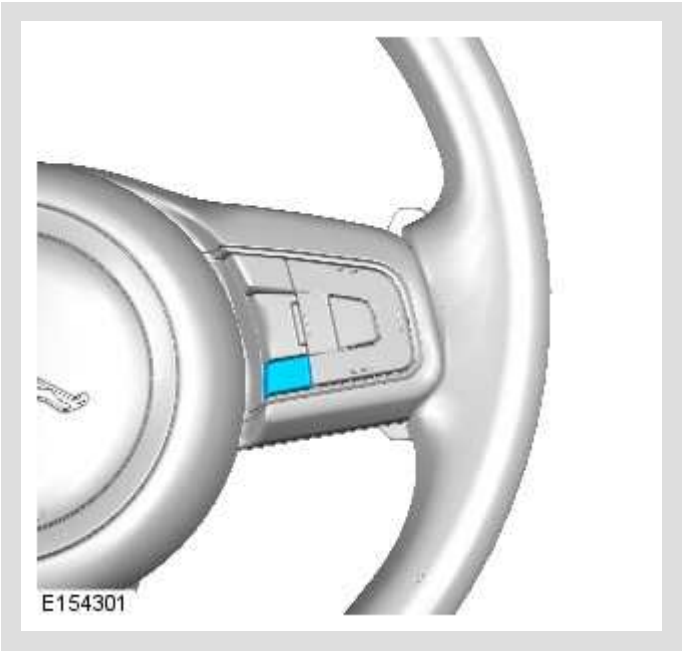
Turn the ignition off.

27. Allow 10 minutes for the engine oil level to stabilize if there has been additional oil top up.

28. **NOTE:**

The following steps are to update the average oil level value.

cardiagn.com



Turn the ignition on.

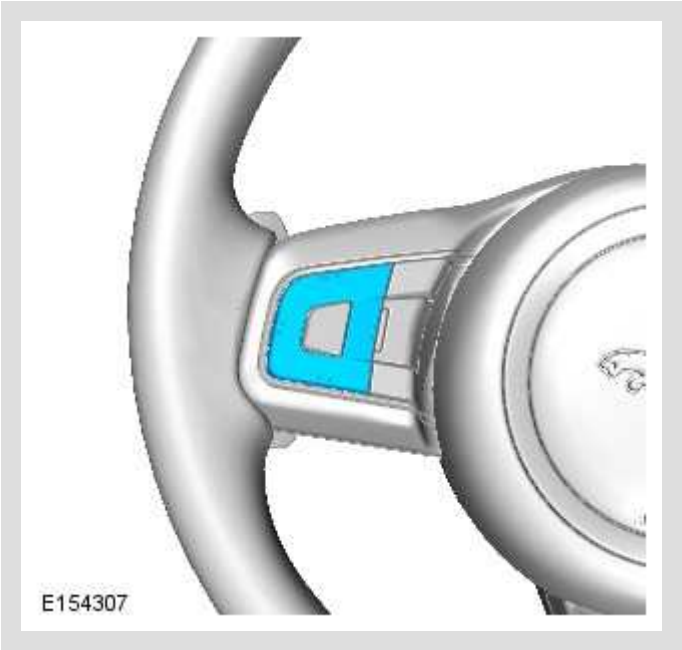
Press and hold the cruise control cancel button for more than 5 seconds.

29. Turn the ignition off.

30. Turn the ignition on.

31.

cardiagn.com



Scroll through the trip menu to access the engine oil level display.

Make sure that the average oil level value has now been updated.

32. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

cardiagn.com

AIR DEFLECTOR (G1580212)

REMOVAL AND INSTALLATION

76.11.41	ENGINE UNDERTRAY - RENEW	ALL DERIVATIVES	0.2	USED WITHINS	
76.11.41	ENGINE UNDERTRAY - RENEW	PROJECT 7	0.2	USED WITHINS	

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1.

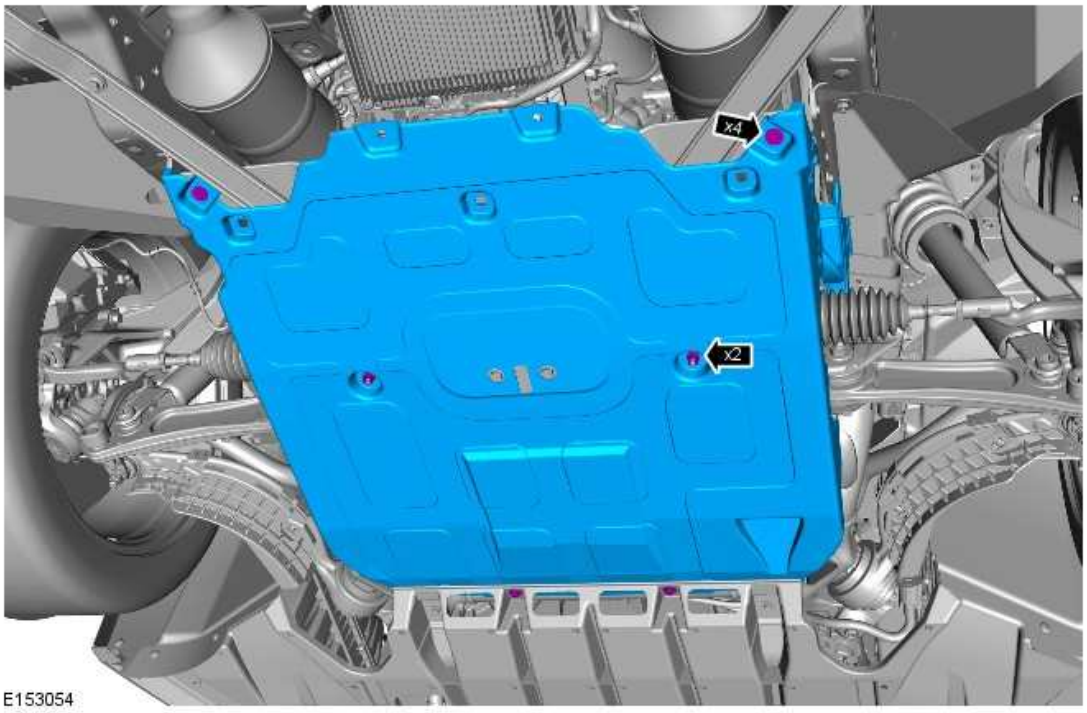
WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

2.

cardiagn.com



Torque:

Nuts and rear bolts **4.1 Nm**

Front bolts **9 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

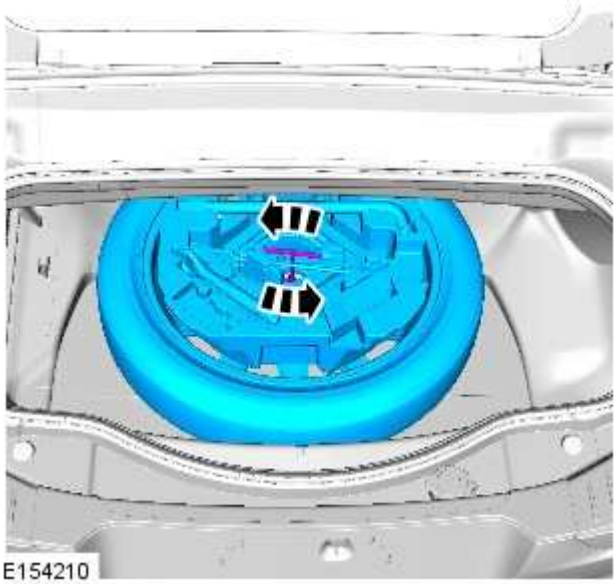
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

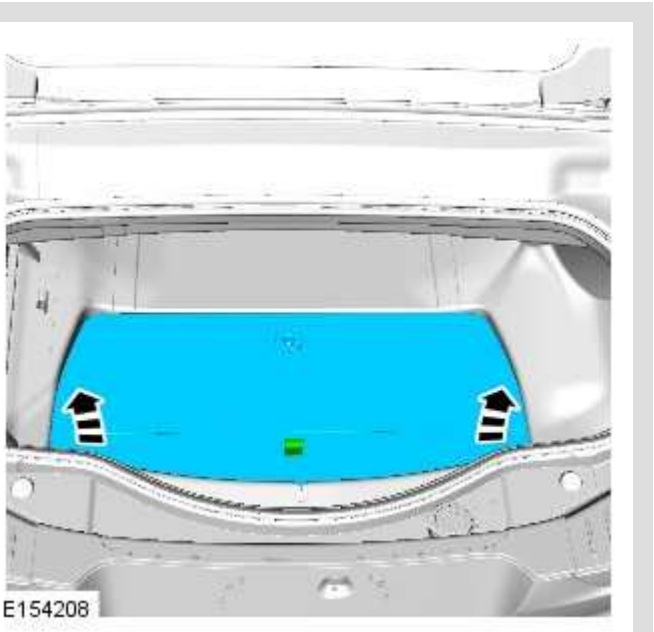
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

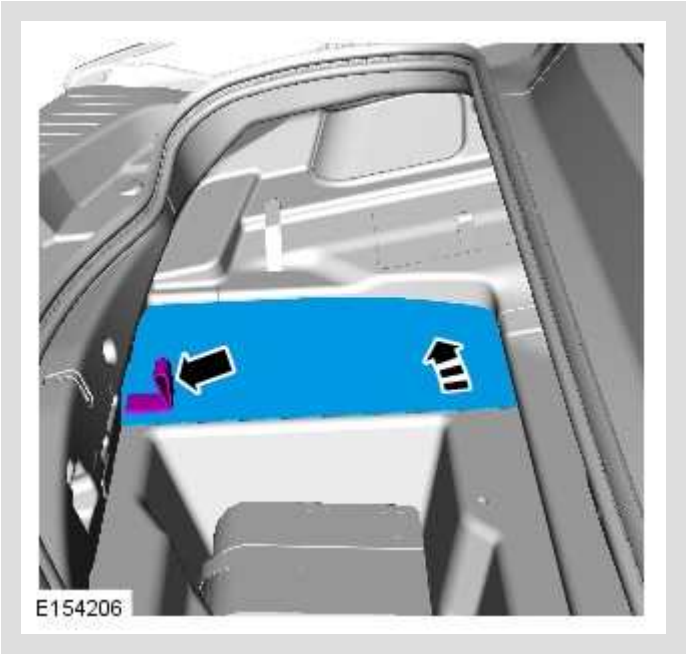


4.



5.

cardiagn.com

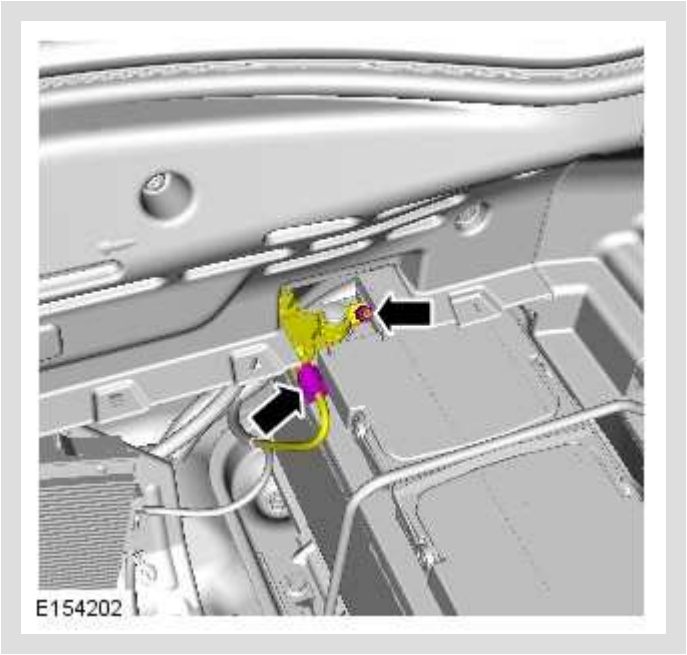


6.

CAUTION:

Take extra care not to damage the wiring harnesses.

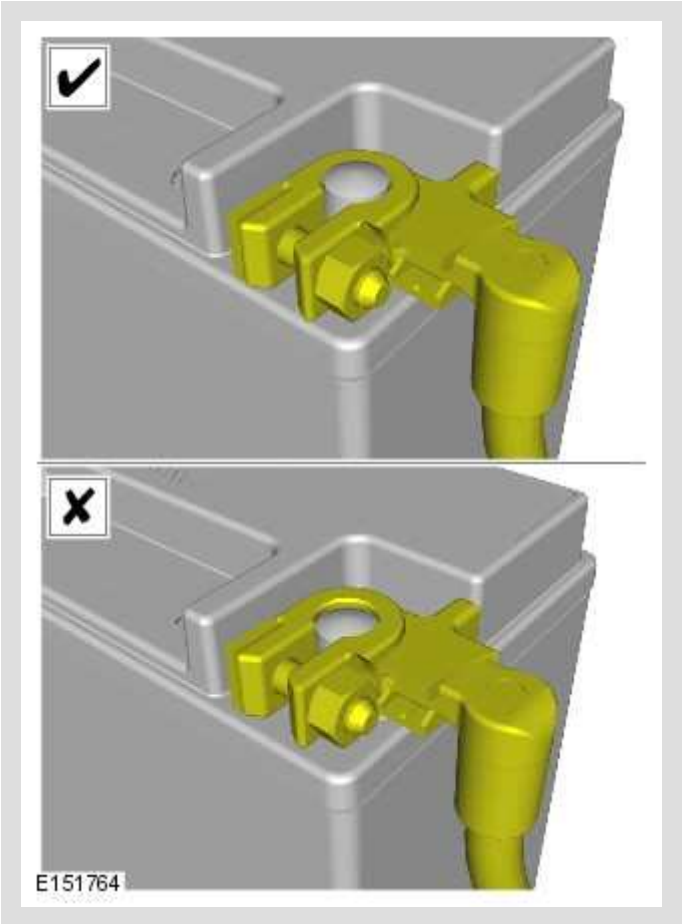
cardiagn.com



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9.

cardiagn.com

NOTE:

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization
11. Enter the audio unit preset radio frequencies.
12. Reset the clock to the correct time.
13. Start the engine and allow to idle until the engine reaches normal operating temperature.
14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

ENGINE (G1587023)

INSTALLATION

INSTALLATION

SPECIAL TOOL(S)

303-021

Engine support bracket

303-1435

Engine Lifting Brackets Rear

cardiagn.com

	303-1436 Engine Lifting Bracket Front

NOTES:

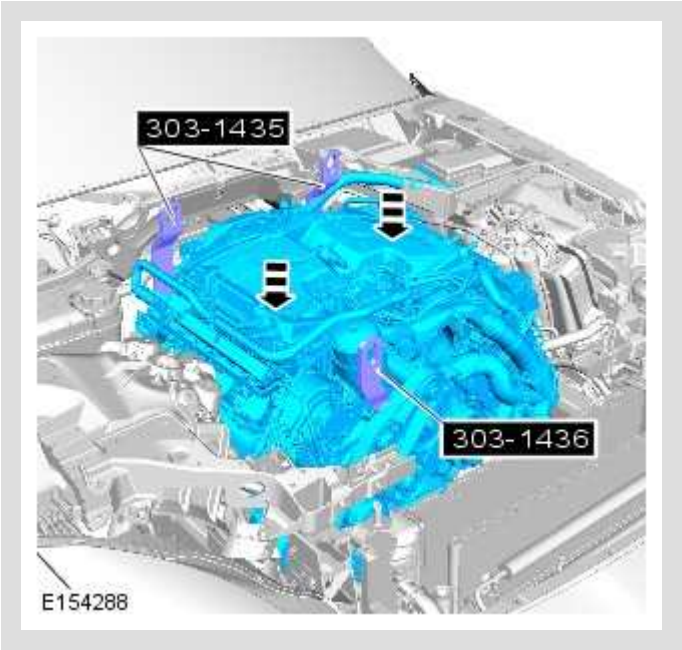
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some components shown removed for clarity.

1.

NOTE:

This step requires the aid of another technician.

cardiagn.com

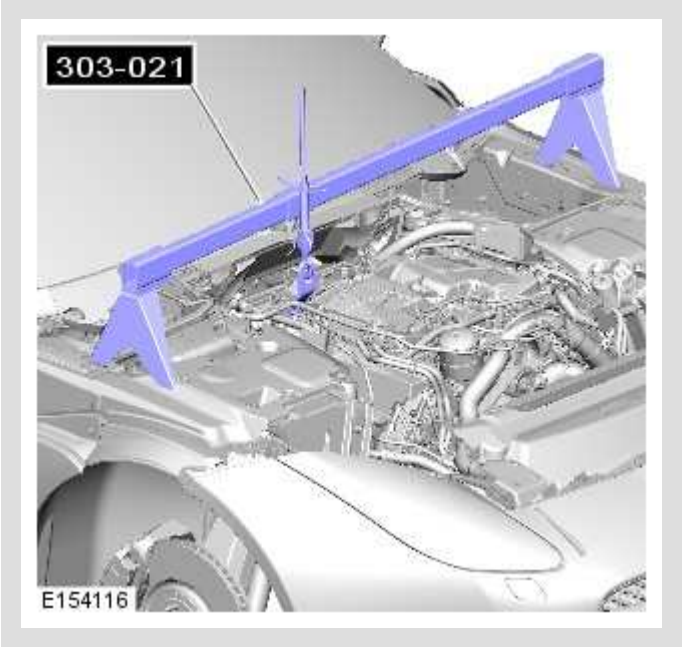


Using a suitable tool, install the engine.

Special Tool(s): 303-1435 , 303-1436

2.

cardiagn.com

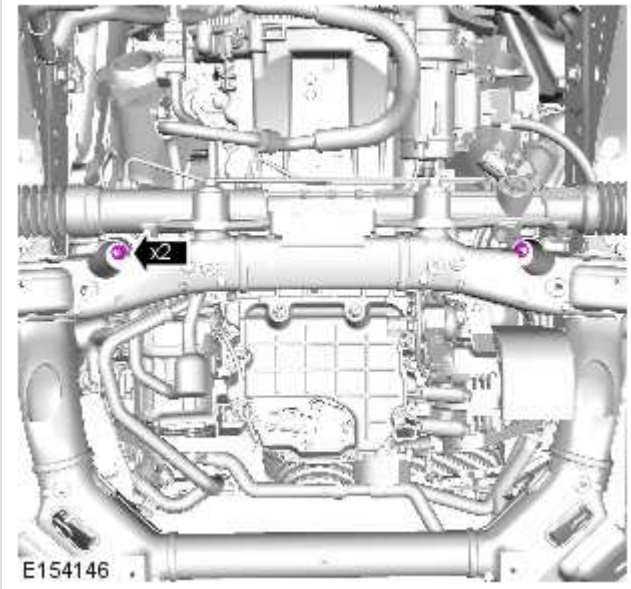


Install the special tool.

Special Tool(s): 303-021

3.

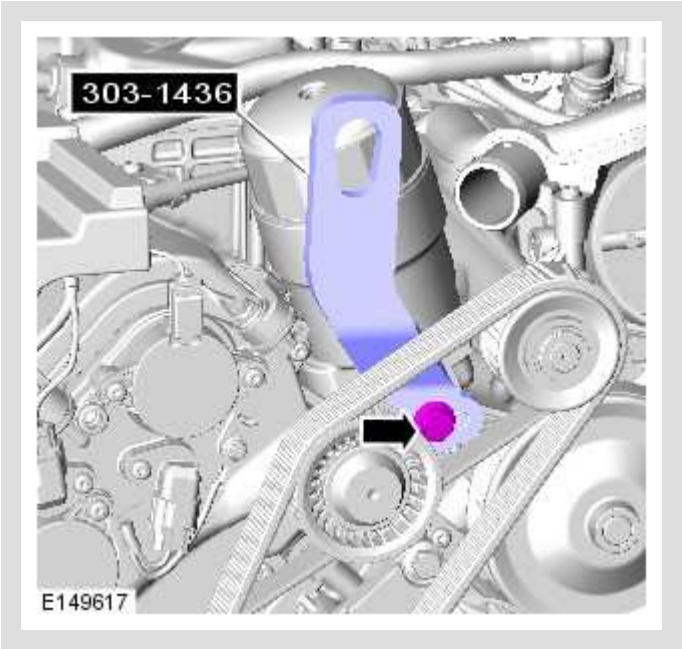
cardiagn.com



Torque: **63 Nm**

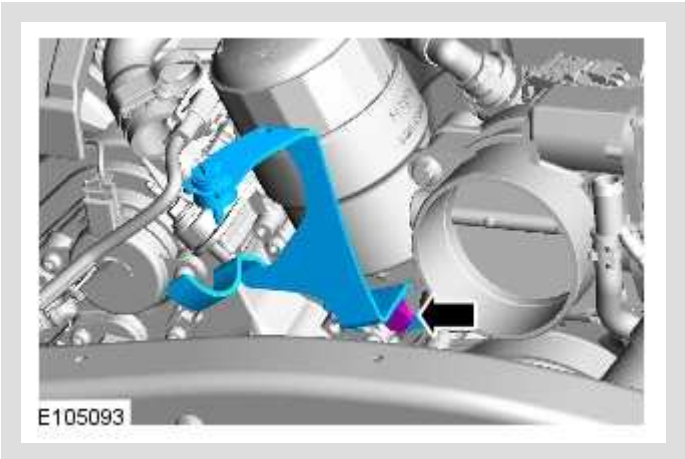
4.

cardiagn.com



Special Tool(s): 303-1436

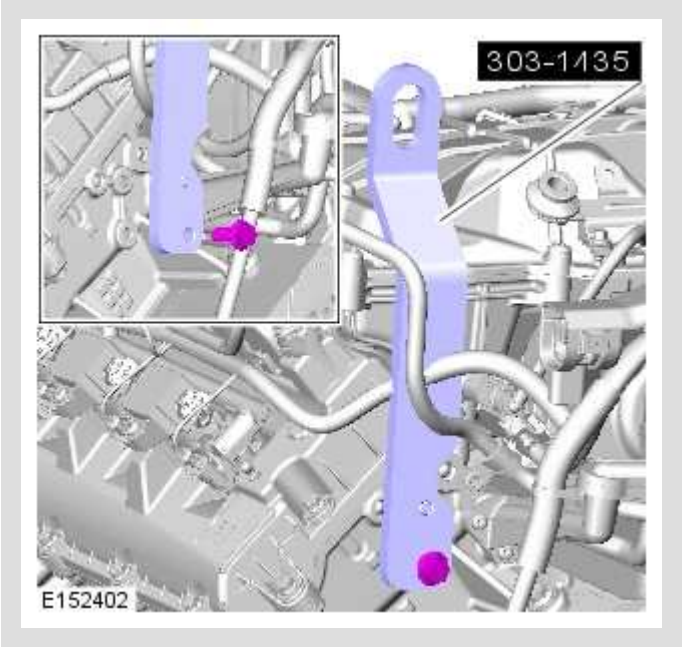
5.



Torque: **25 Nm**

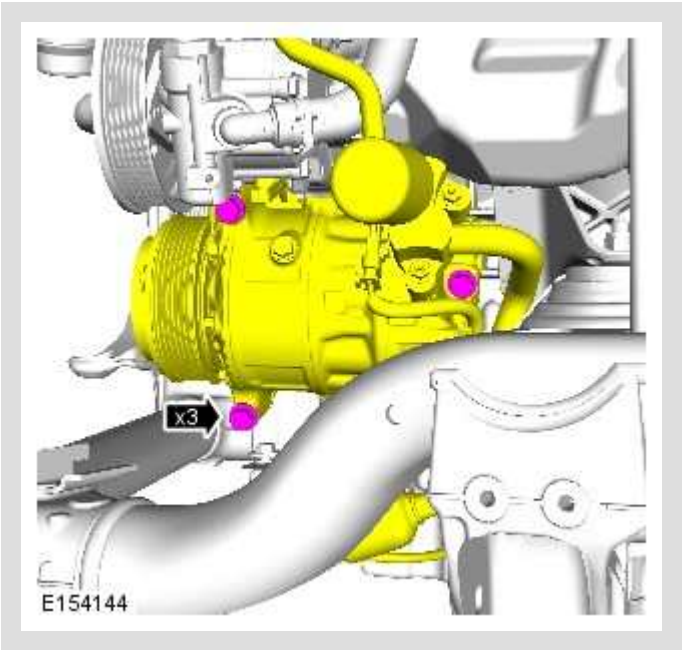
cardiagn.com

6.



Special Tool(s): 303-1435

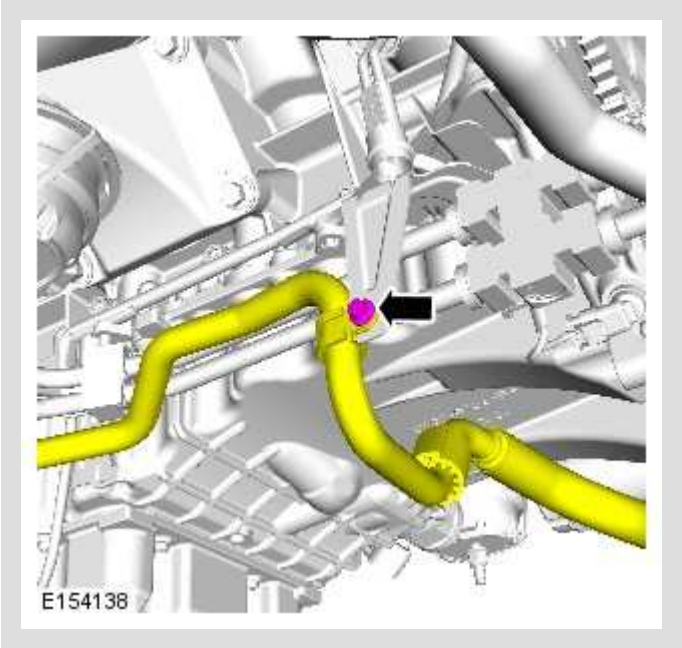
7.



Torque: **25 Nm**

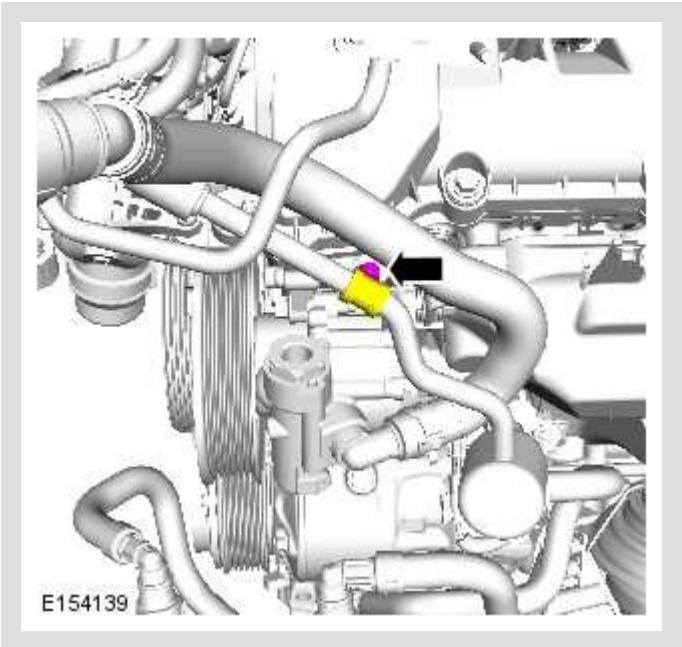
8.

cardiagn.com



Torque: **10 Nm**

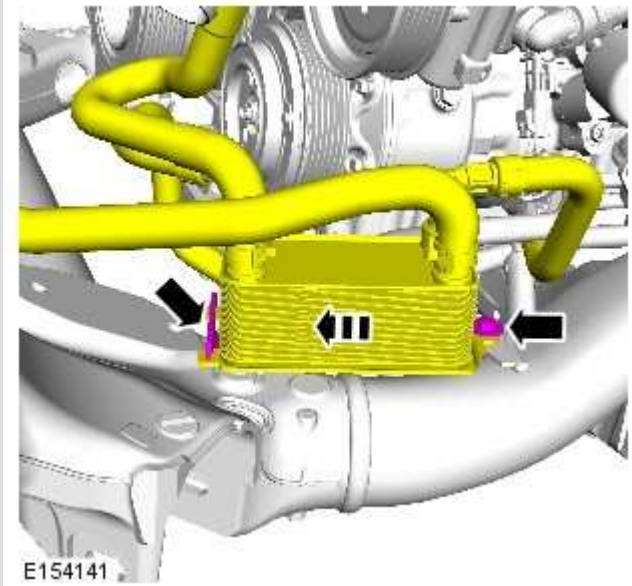
9.



Torque: **10 Nm**

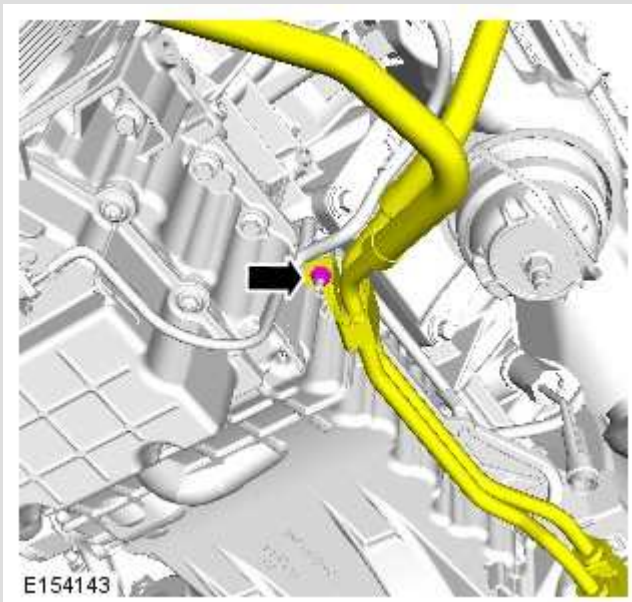
cardiagn.com

10.



Torque: **5 Nm**

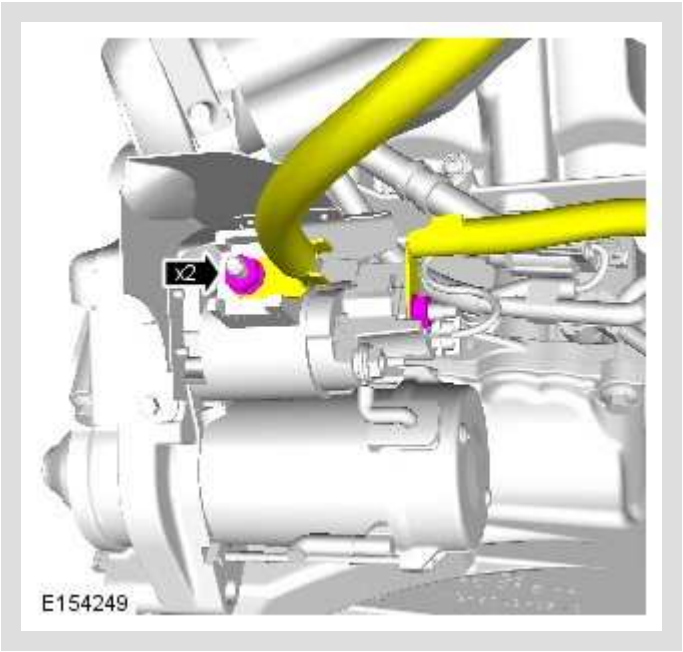
11.



Torque: **10 Nm**

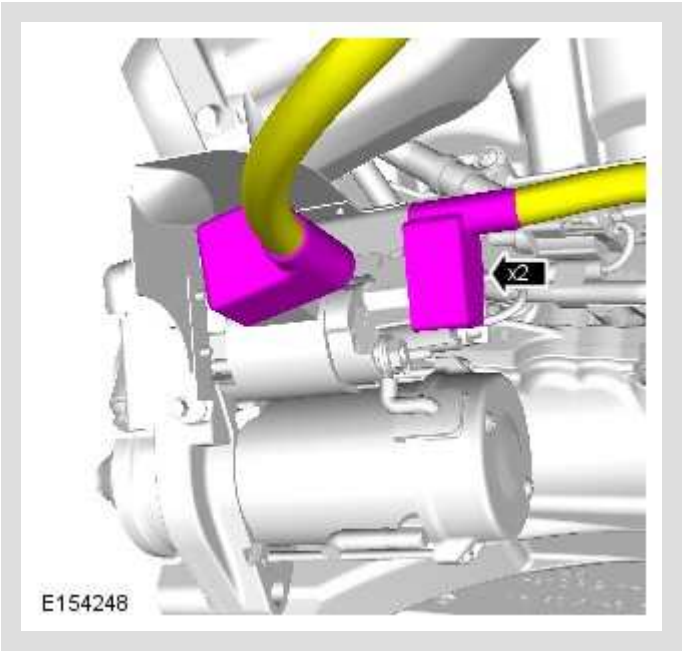
12.

cardiagn.com



Torque: **12 Nm**

13.



14.

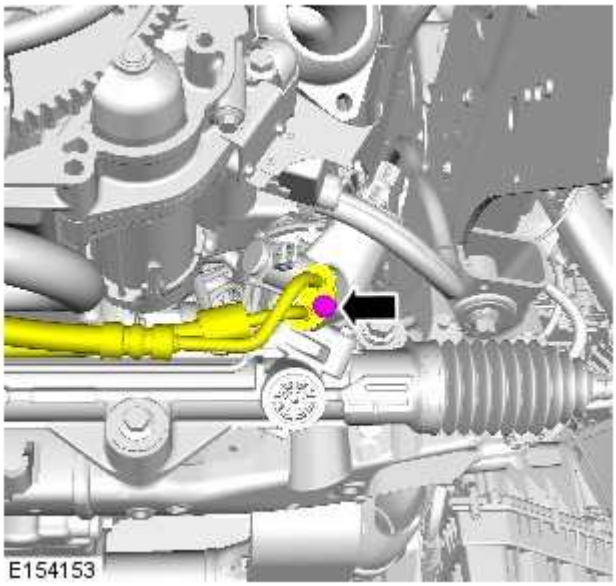
cardiagn.com

CAUTION:

Make sure that the area around the component is clean and free of foreign material.

NOTE:

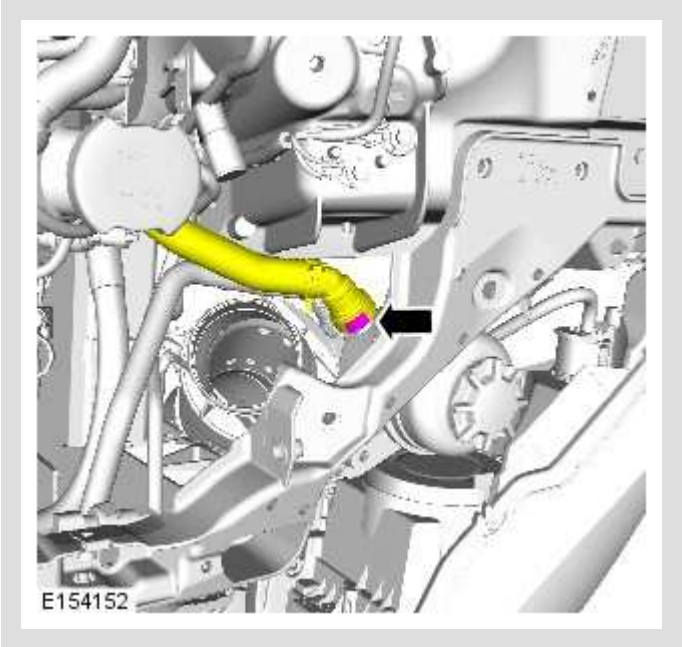
Install new O-ring seals.



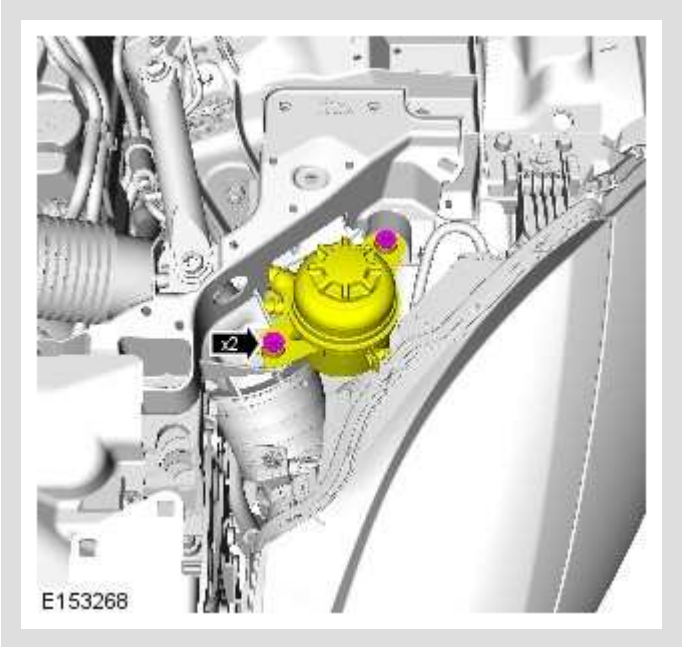
Torque: **15 Nm**

15.

cardiagn.com



16.

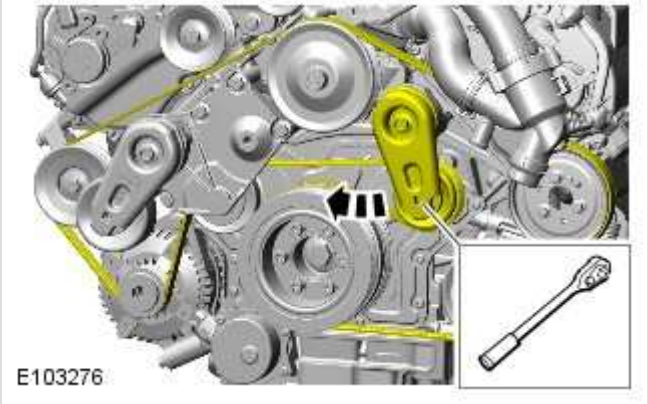


Torque: **10 Nm**

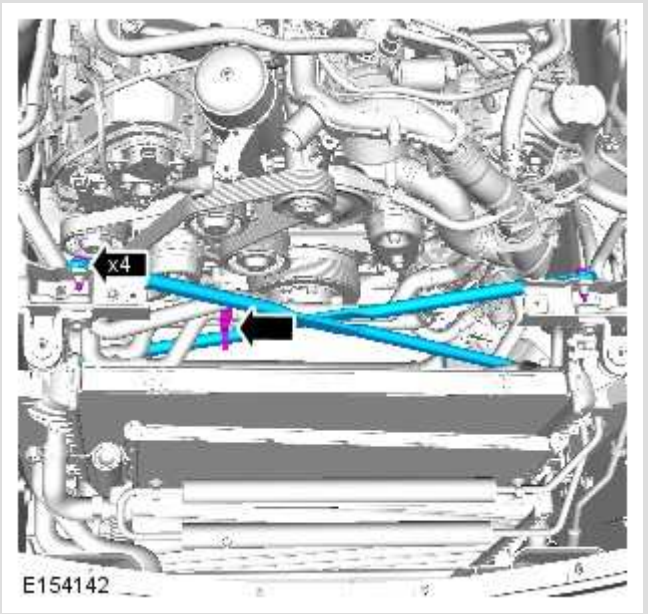
17. Refer to: Power Steering System Filling (211-00 Steering System - General Information, General Procedures).

18.

cardiagn.com



19.



Torque: **25 Nm**

20.

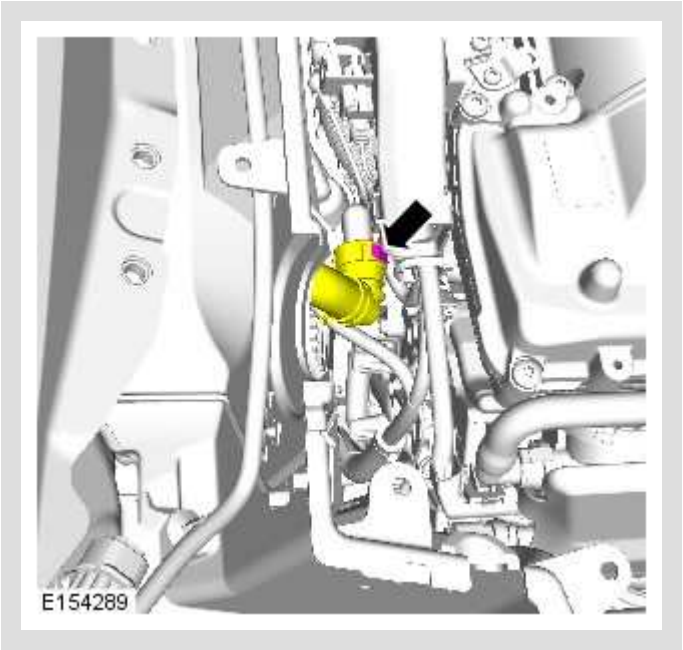
NOTE:

Repeat the procedure for the other side.

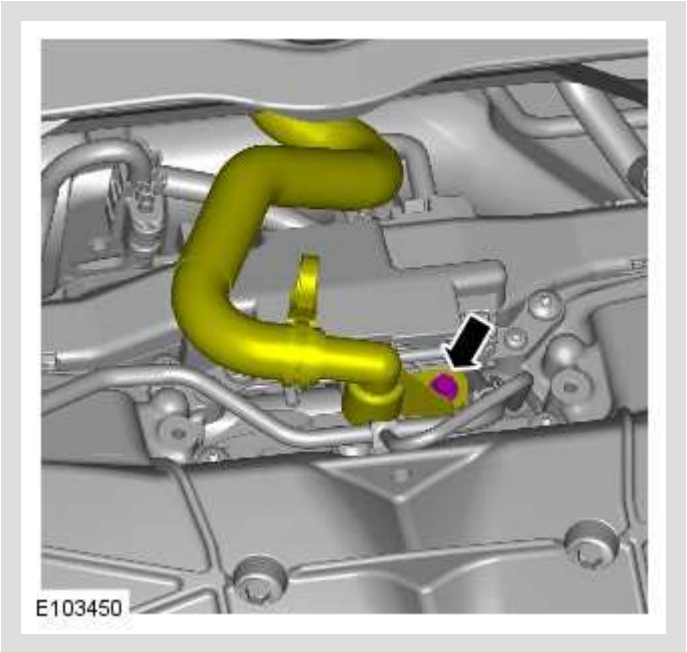
cardiagn.com

Refer to: Fender Splash Shield (501-02 Front End Body Panels, Removal and Installation).

21.



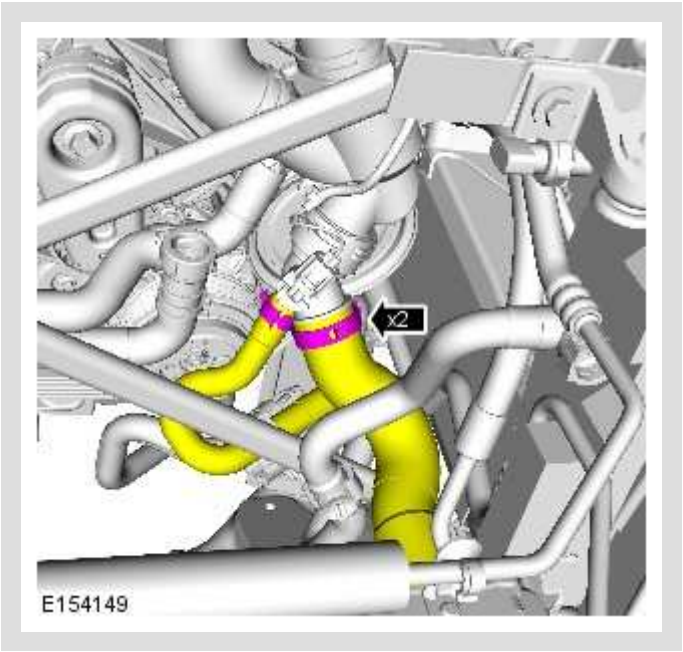
22.



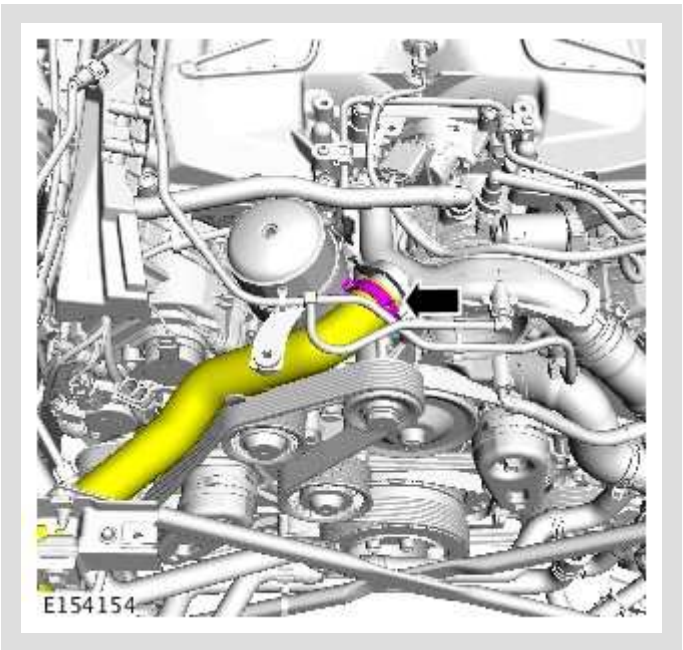
Torque: **10 Nm**

23.

cardiagn.com

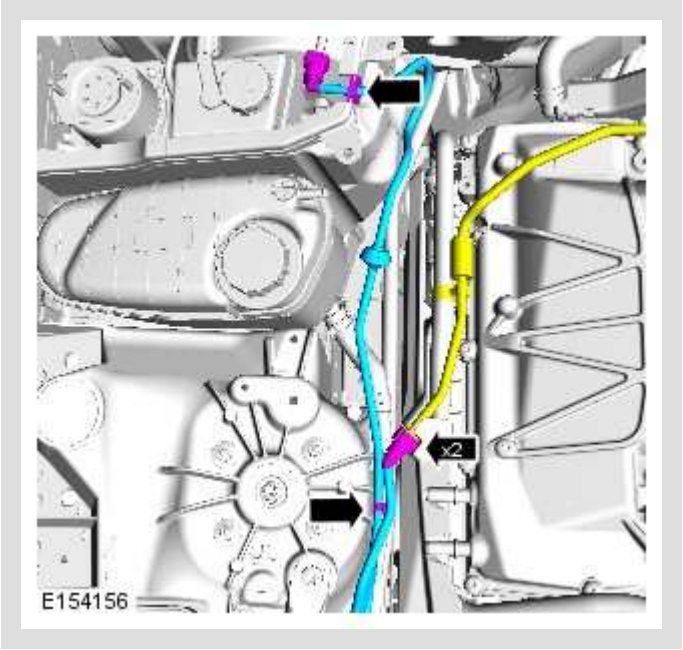


24.

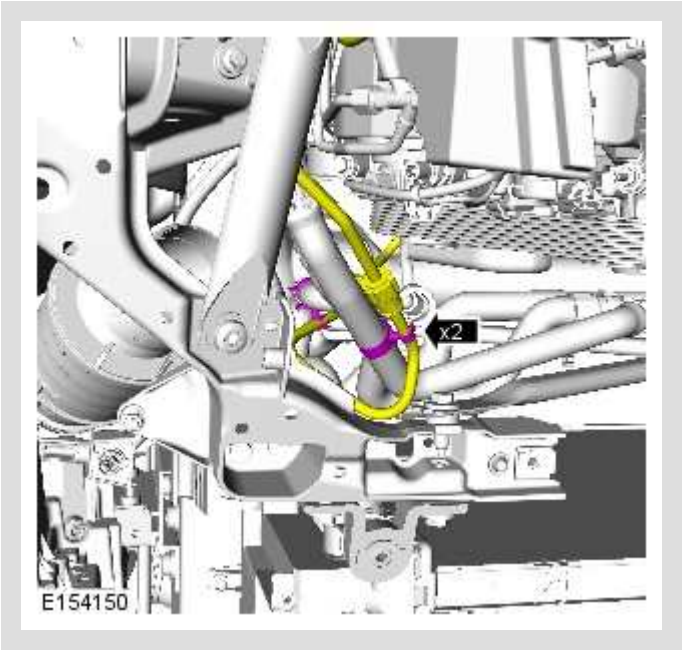


25.

cardiagn.com

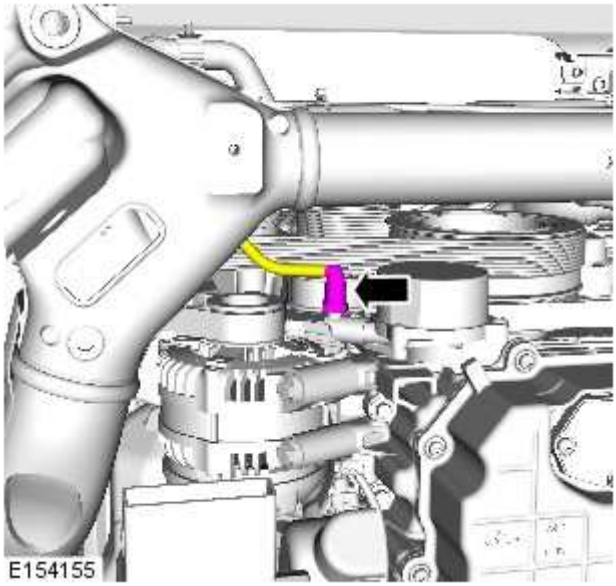


26.

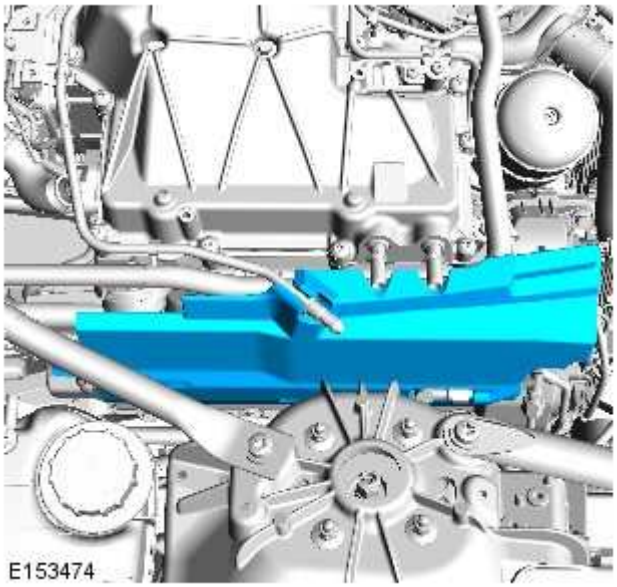


27.

cardiagn.com

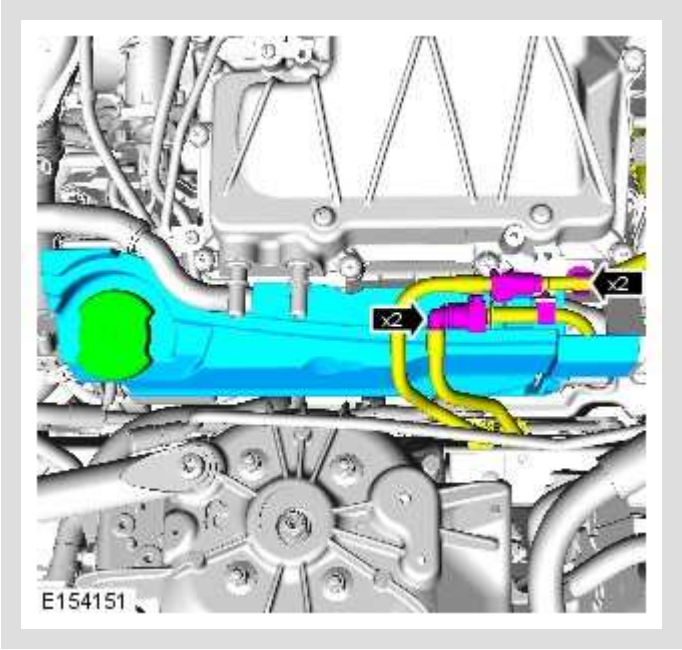


28.

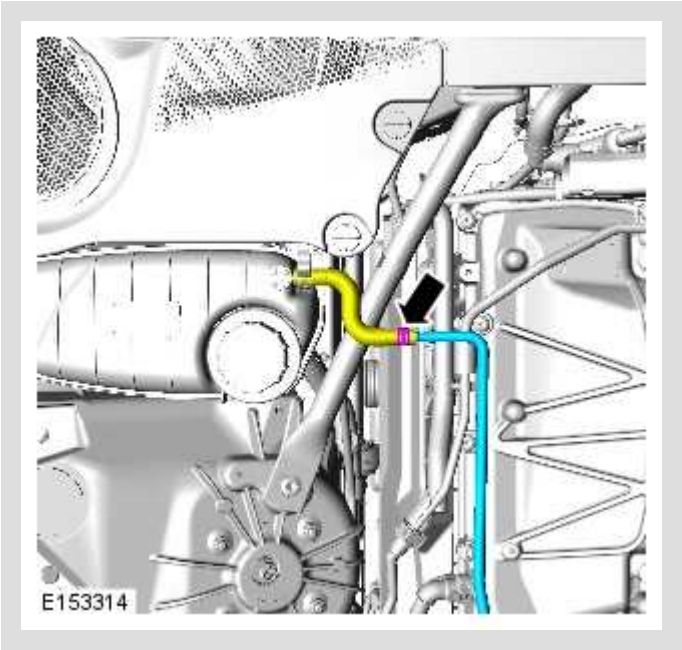


29.

cardiagn.com

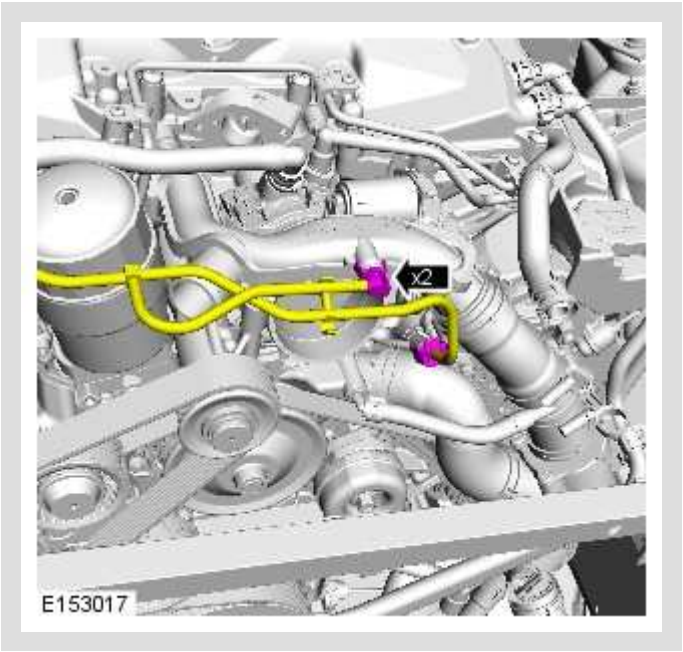


30.

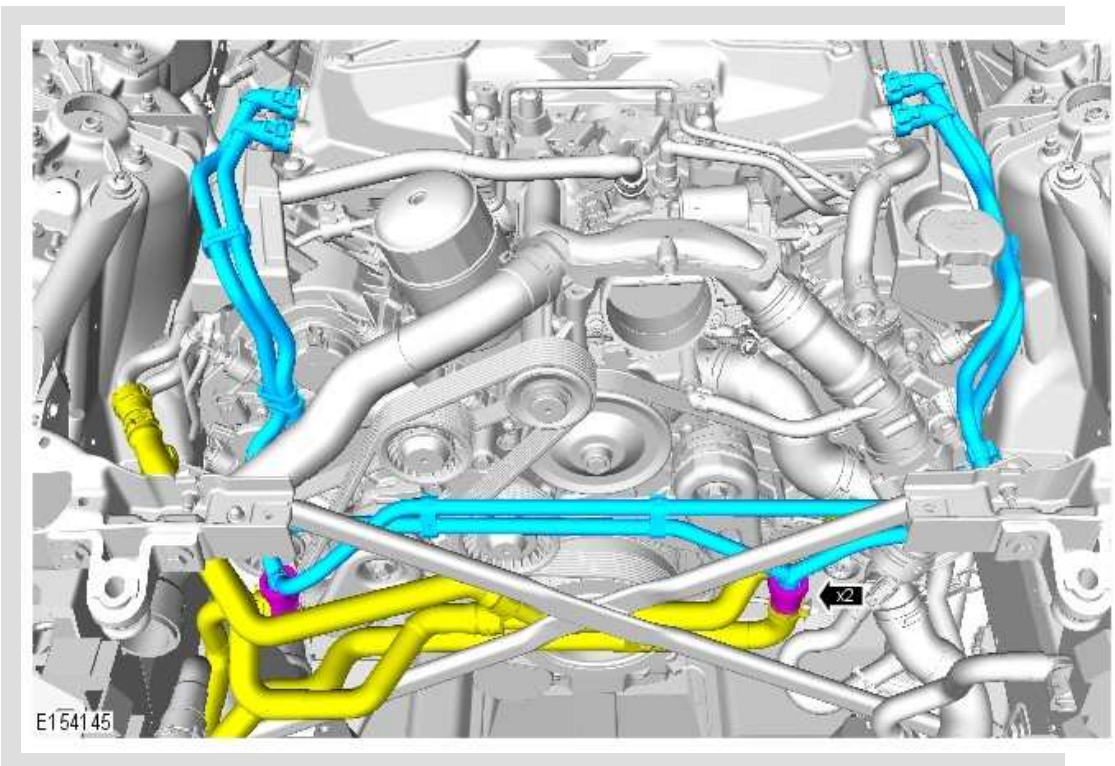


31.

cardiagn.com

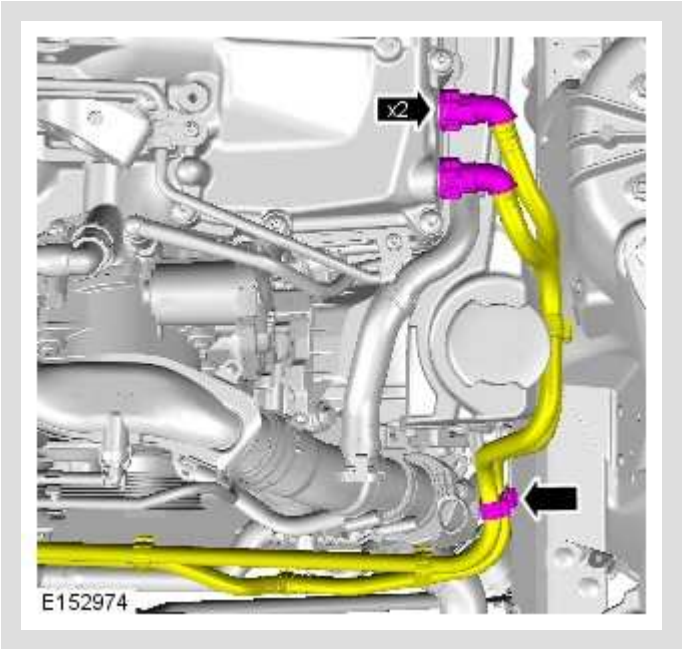


32.

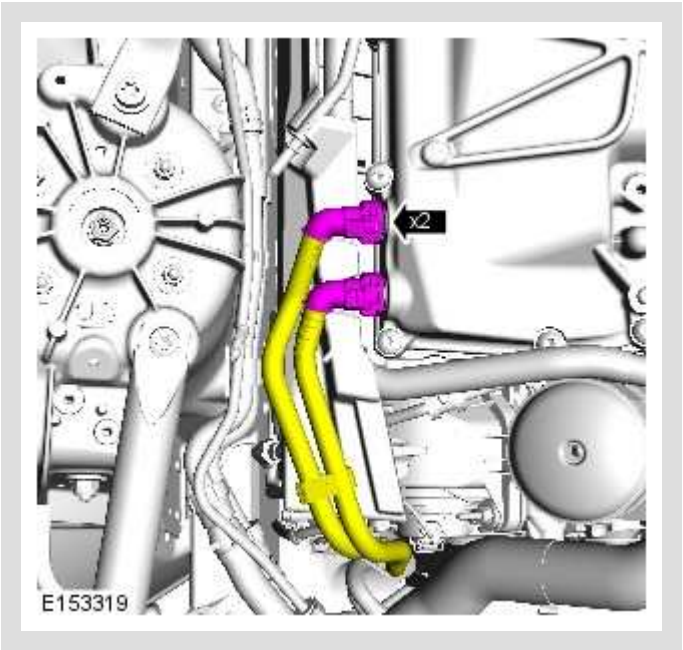


cardiagn.com

33.

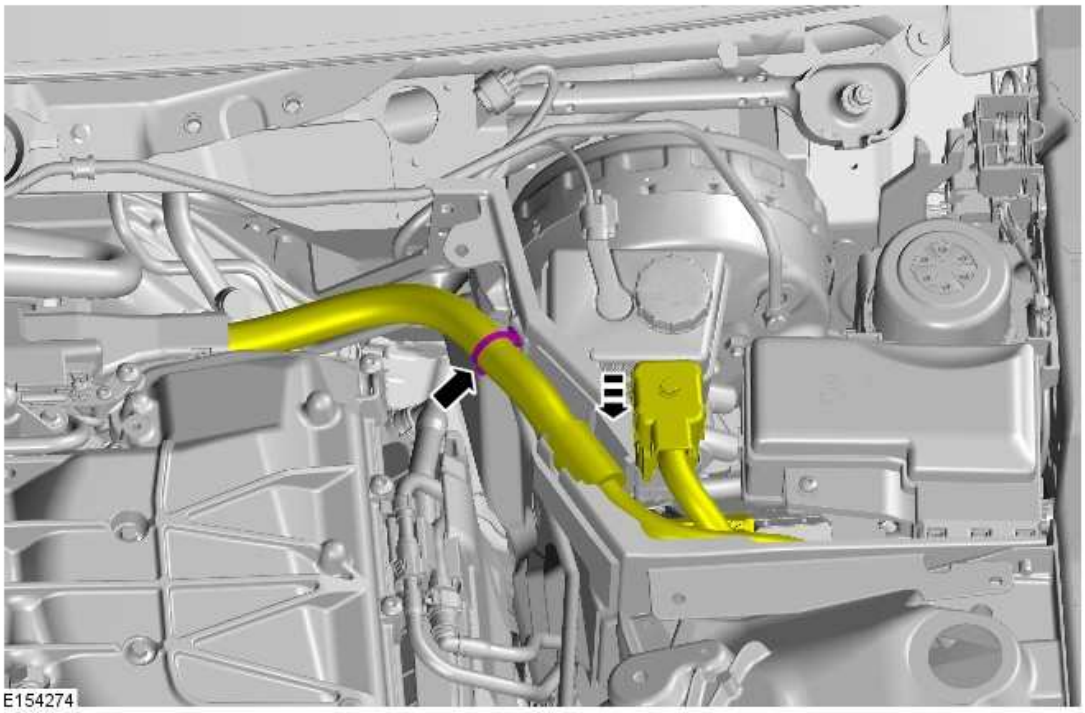


34.



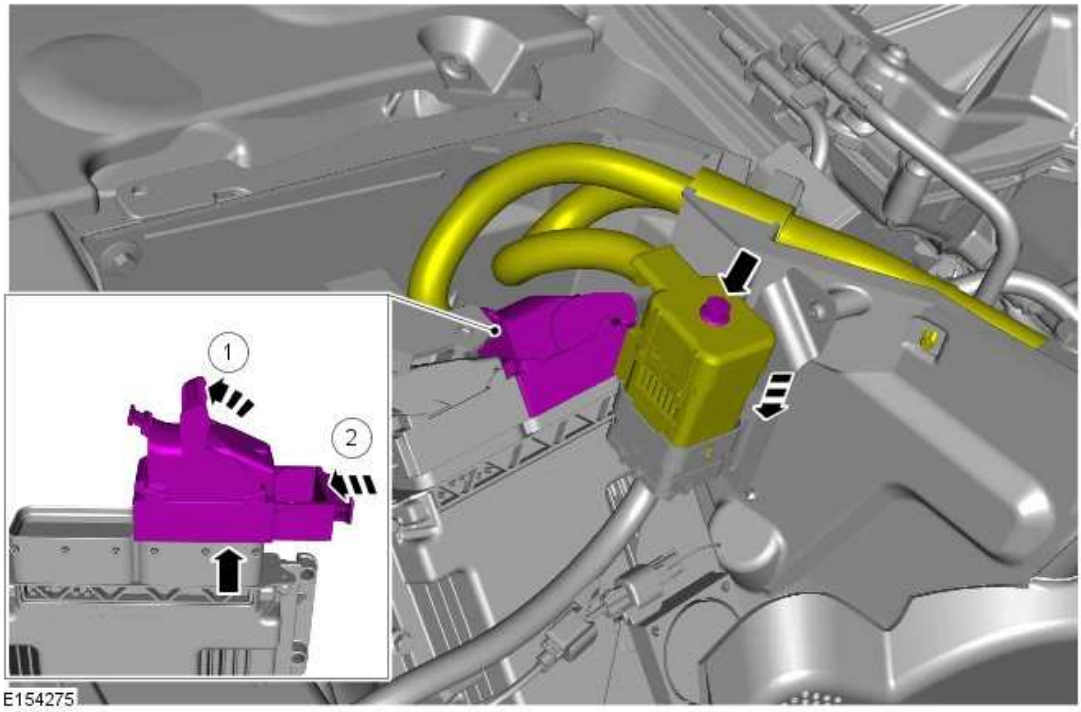
35.

cardiagn.com



36.

cardiagn.com



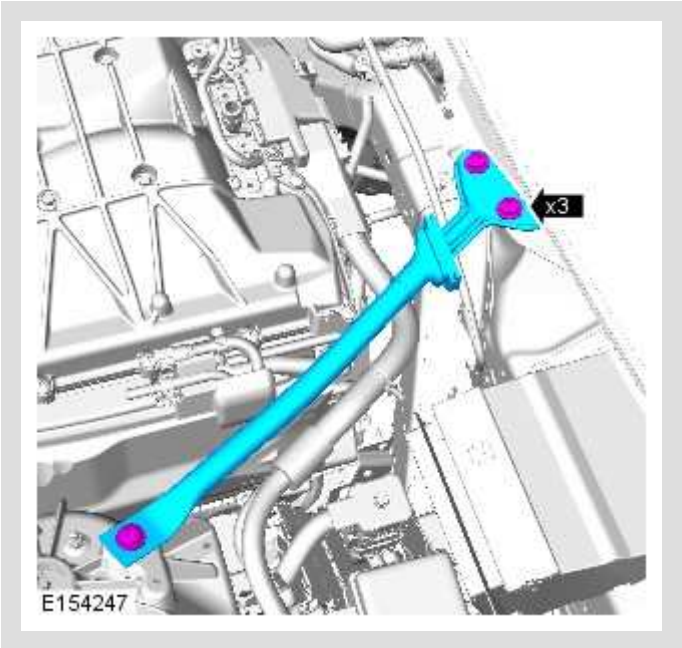
Torque: **6 Nm**

37.

NOTE:

The step must be carried out on both sides.

cardiagn.com

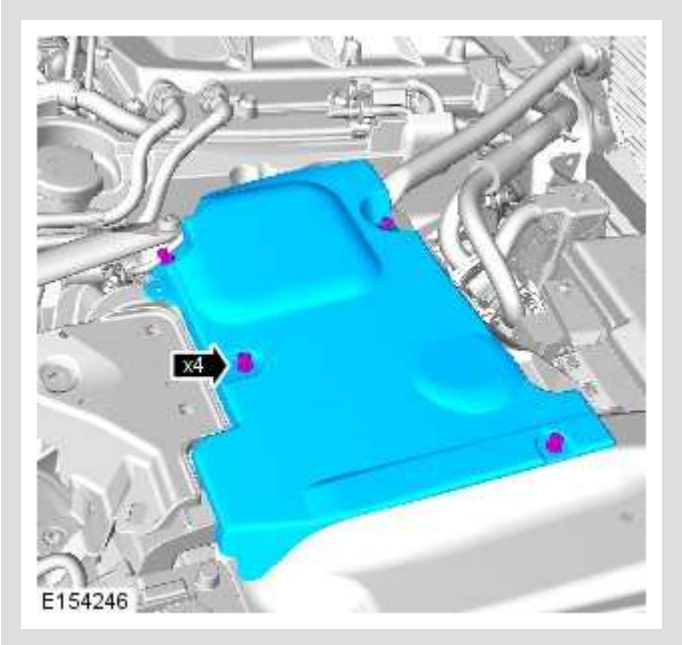


Torque: **55 Nm**

38.

NOTE:

The step must be carried out on both sides.



cardiagn.com

39. Refer to: Transmission (307-01B Automatic Transmission /Transaxle - V8 S/C 5.0L Petrol, Installation).

40. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

41. Refer to: Air Cleaner Outlet Pipe RH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

42. Refer to: Air Cleaner Outlet Intermediate Pipe LH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

43. Refer to: Cooling Fan Motor and Shroud (303-03C Engine Cooling - V8 S/C 5.0L Petrol, Removal and Installation).

44. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

INTAKE AIR DISTRIBUTION AND FILTERING - V8 S/C 5.0L PETROL

AIR CLEANER OUTLET INTERMEDIATE PIPE LH

(G1581640)

REMOVAL AND INSTALLATION

AIR CLEANER OUTLET		

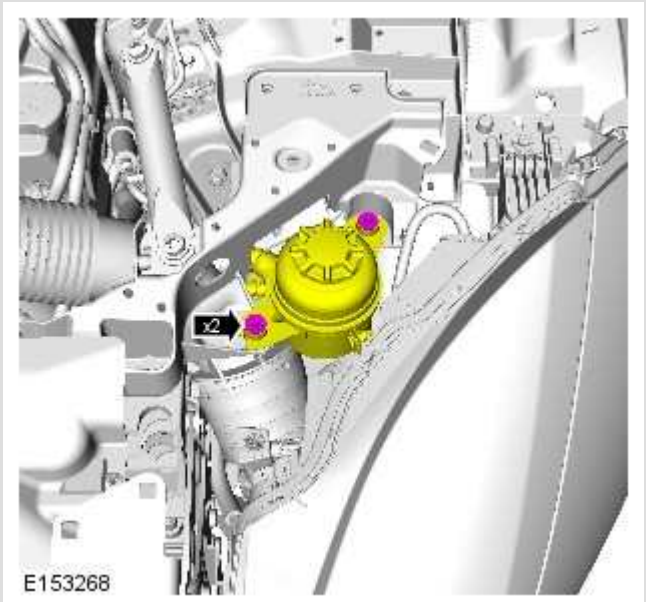
19.10.37	INTERMEDIATE PIPE - LEFT HAND -RENEW	ALL DERIVATIVES	0.2	USED WITHINS

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

2. 

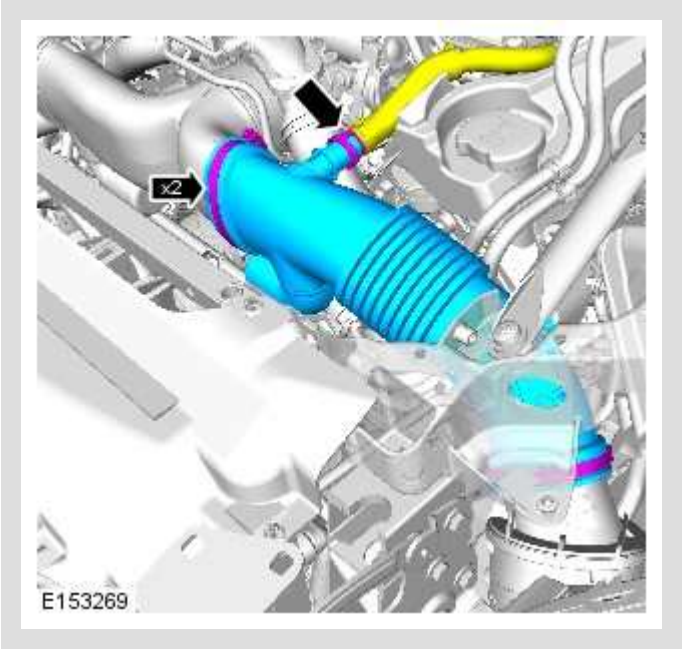
Torque: **9 Nm**

3.

cardiagn.com

NOTE:

Make sure that the clamps are fitted in the position shown.



Torque: **3.3 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

AIR CLEANER OUTLET PIPE T-CONNECTOR (G1580352)

REMOVAL AND INSTALLATION

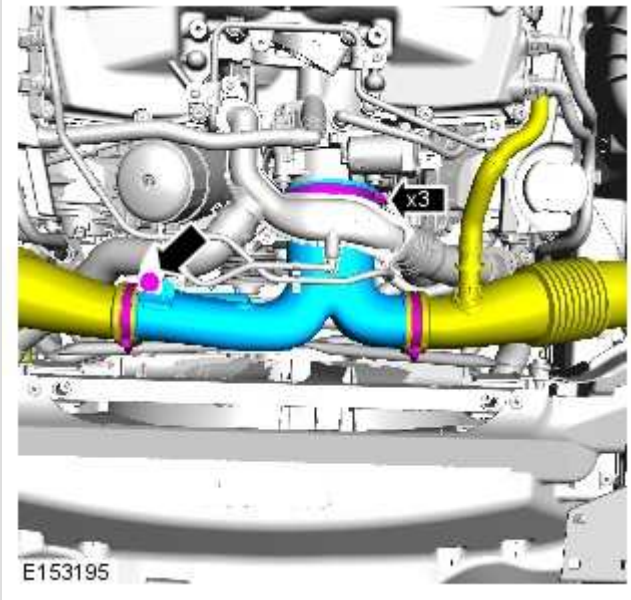
19.10.39	AIR CLEANER OUTLET PIPE T-CONNECTOR - RENEW	ALL DERIVATIVES	0.1	USED WITHINS	

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

2. 

Torque:

M6 **9 Nm**

Air Intake Pipe to T-Connector Clamps **3.3 Nm**

T-Connector to Throttle Body Clamp **4.1 Nm**

cardiagn.com

INSTALLATION

1. To install, reverse the removal procedure.

2015.0 F-TYPE (X152), 303-03

ENGINE COOLING - V8 S/C 5.0L PETROL

COOLING FAN MOTOR AND SHROUD (G1580408)

REMOVAL AND INSTALLATION

26.25.11	FAN COWL - RENEW	ALL DERIVATIVES	0.9	USED WITHINS

REMOVAL

CAUTION:

Always protect the cooling pack elements to prevent accidental damage.

cardiagn.com

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some components shown removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

3. **WARNING:**

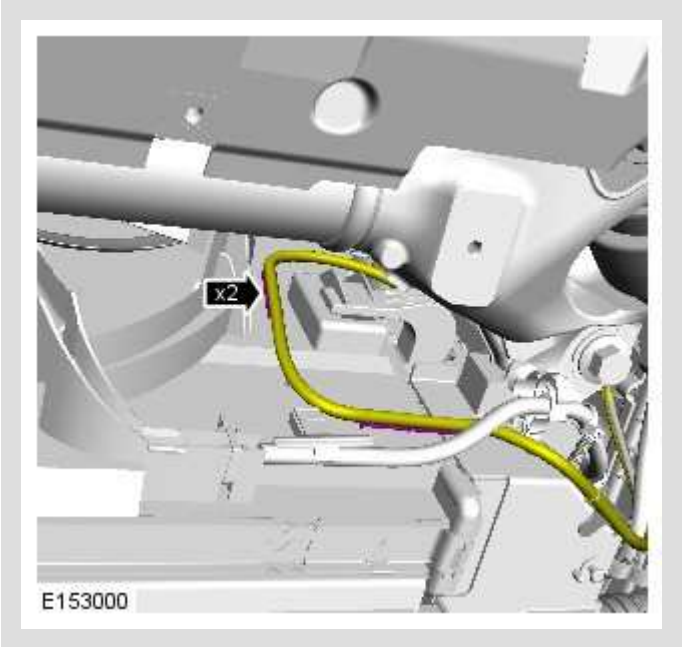
   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

4. **NOTE:**

   Some components shown removed for clarity.

cardiagn.com

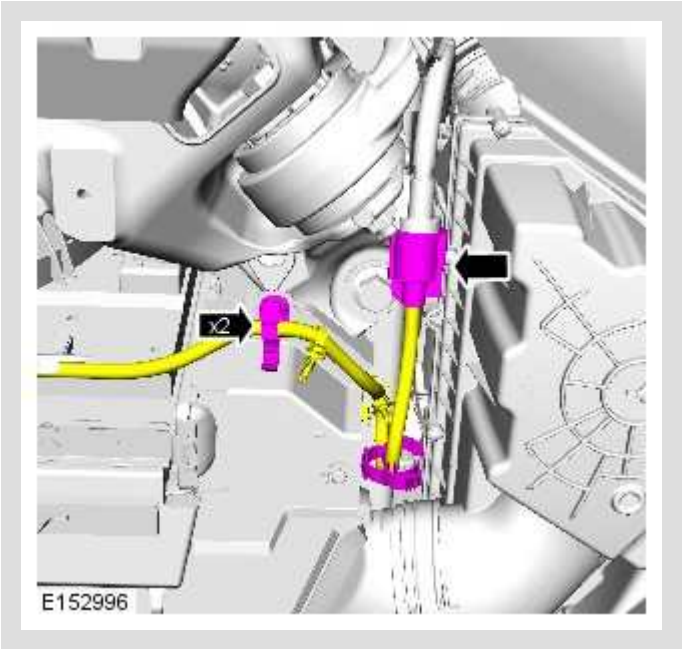


5.

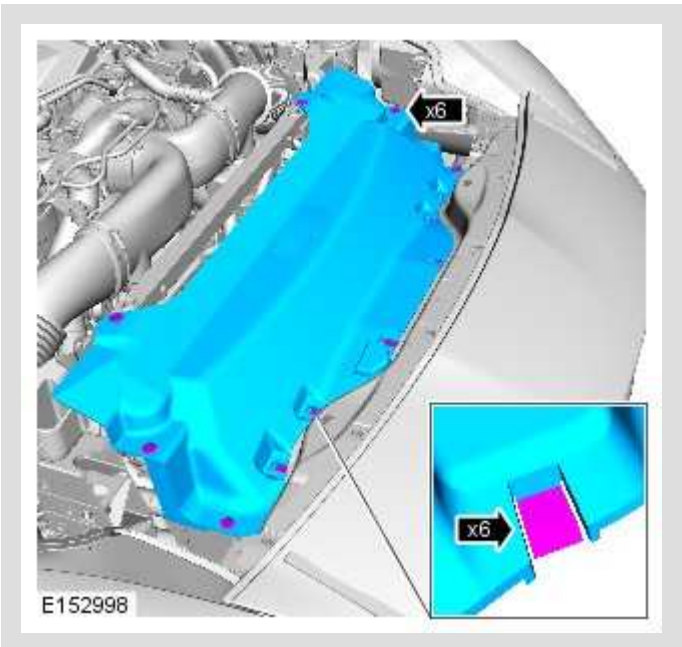
NOTE:

Some components shown removed for clarity.

cardiagn.com

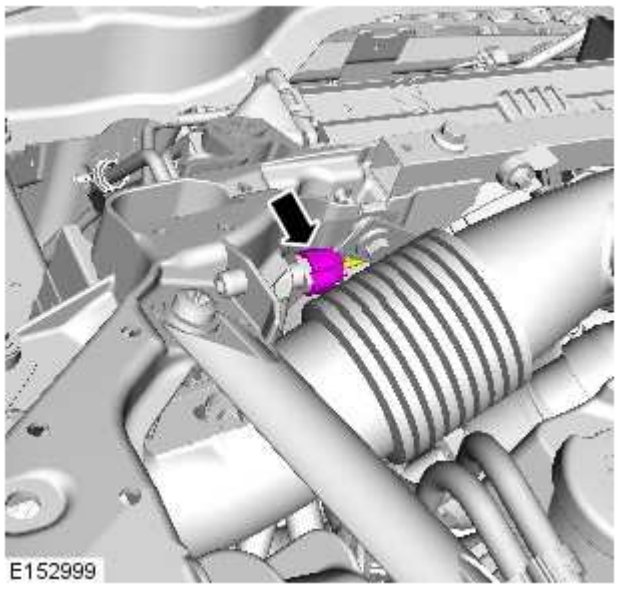


6.

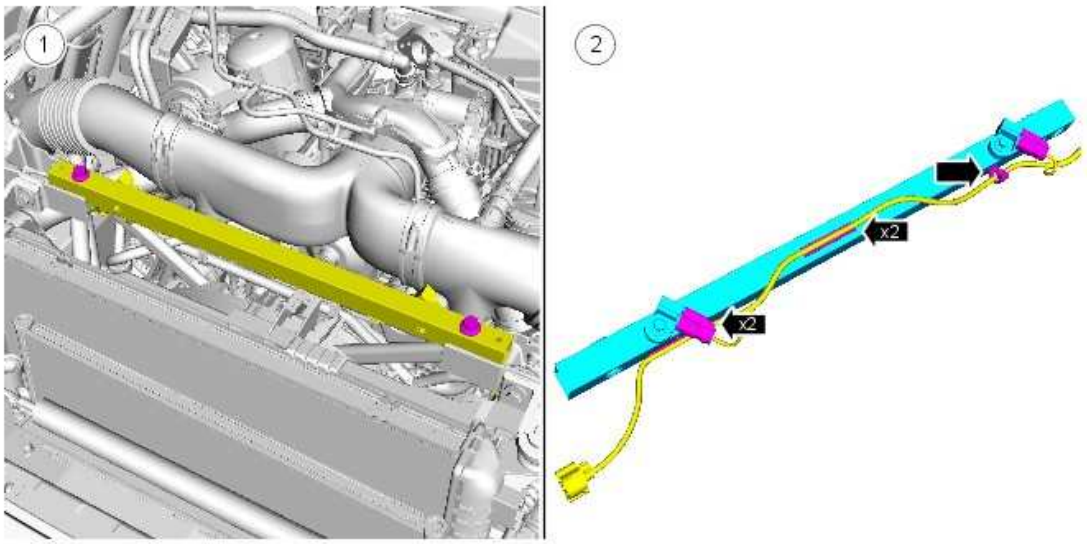


cardiagn.com

7.



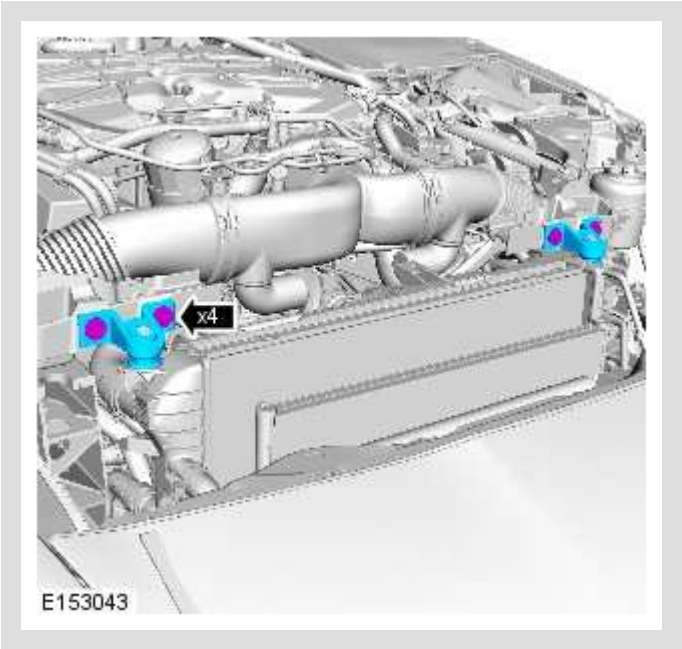
8.



Torque: **25 Nm**

9.

cardiagn.com



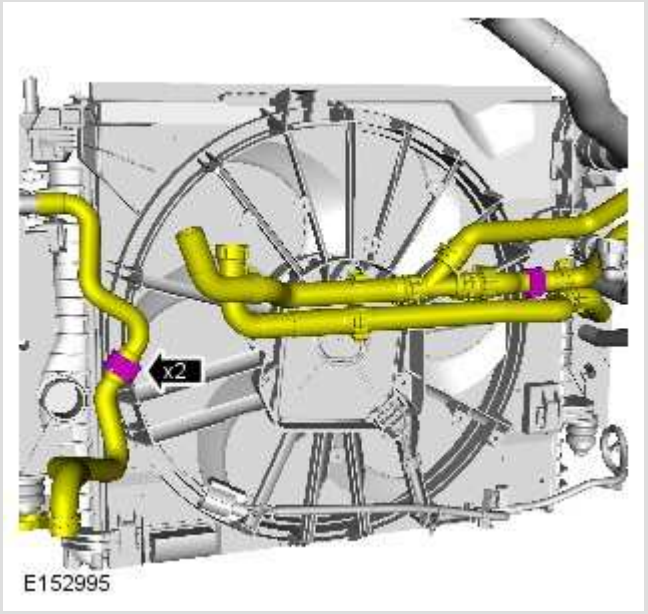
Torque: **25 Nm**

10.

NOTE:

Component shown removed for clarity.

cardiagn.com

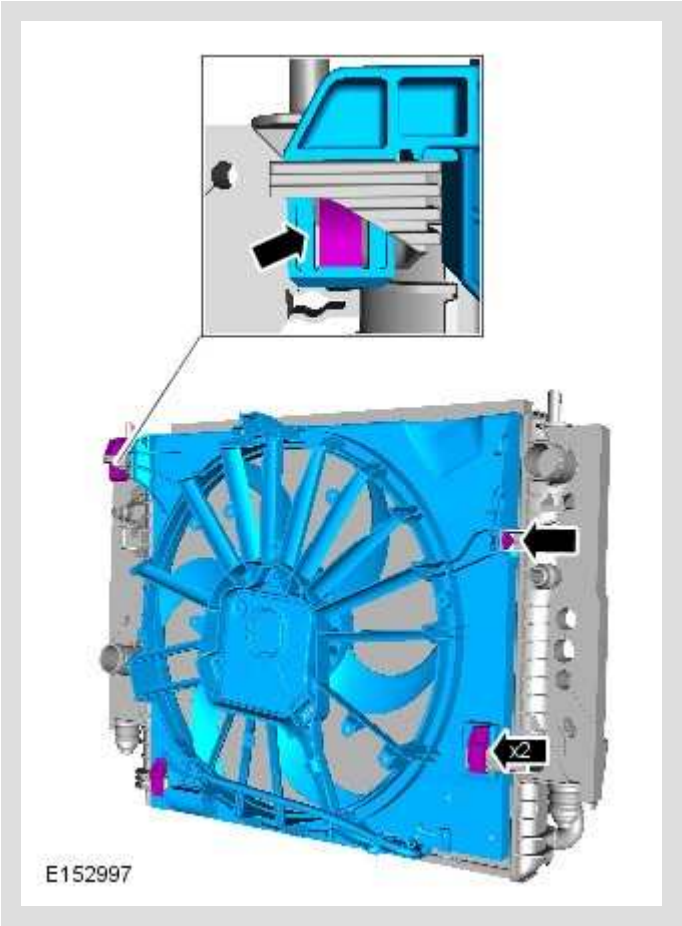


11.

NOTE:

Component shown removed for clarity.

cardiagn.com



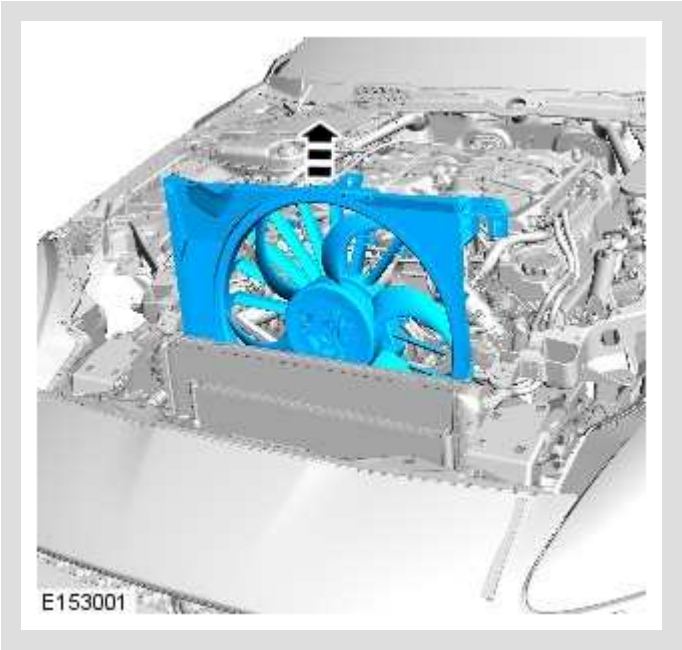
Torque: **7 Nm**

12.

CAUTION:

Always protect the cooling pack elements to prevent accidental damage.

cardiagn.com



INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

BATTERY

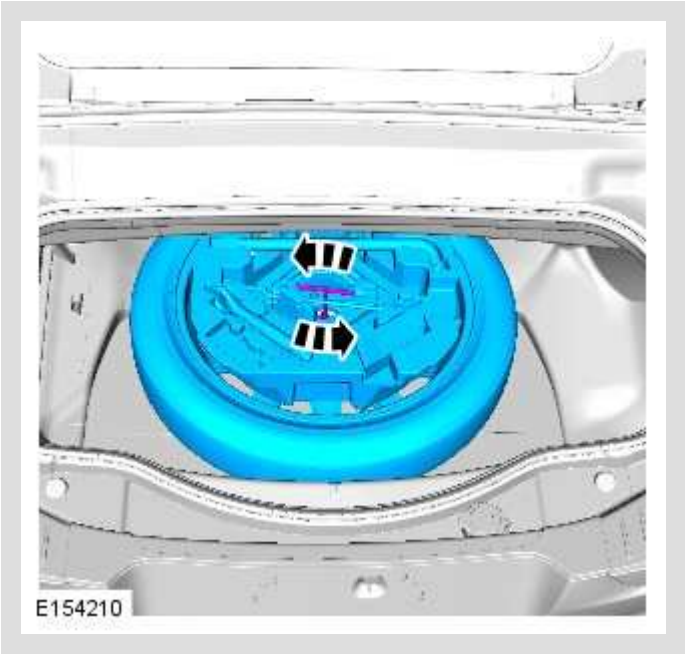
86.15.15	DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

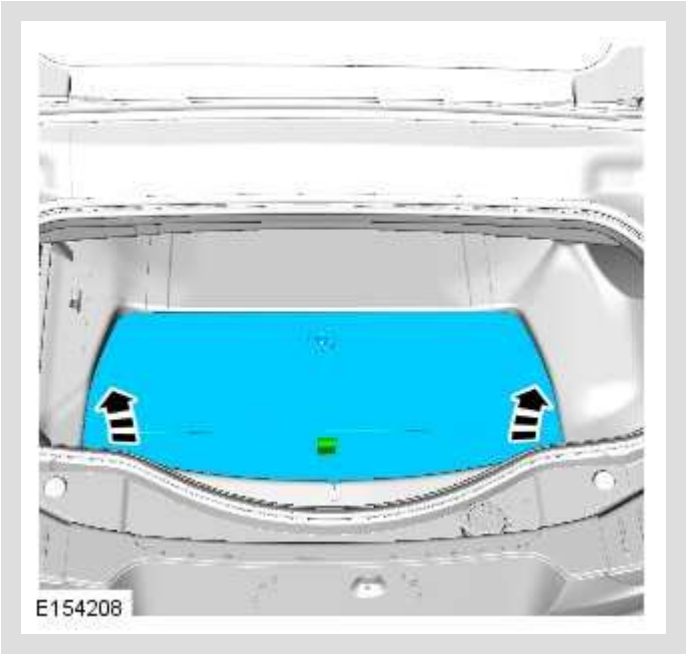
1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

2. Obtain and record the audio unit preset radio frequencies.

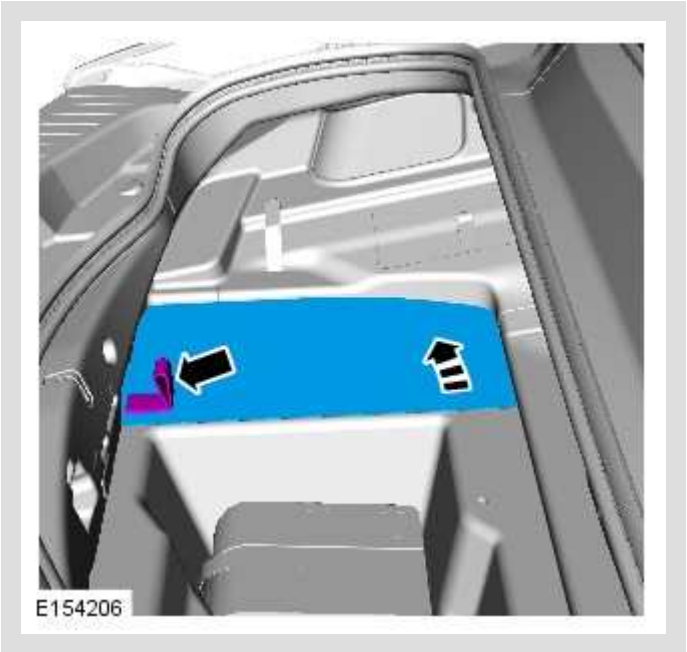
3. 

4.

cardiagn.com



5.

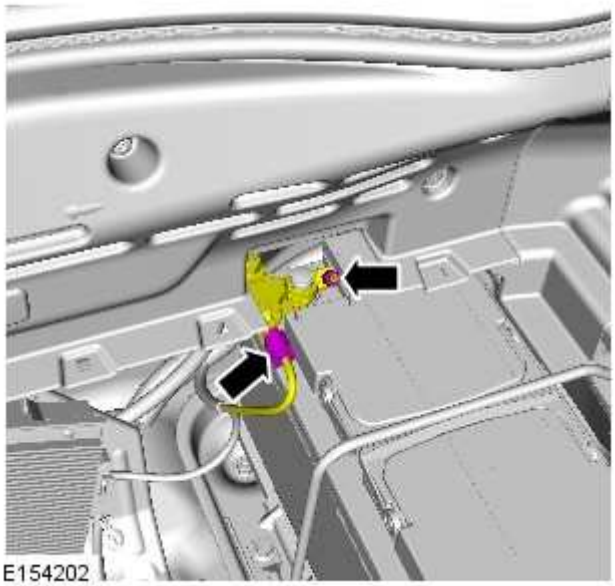


6.

CAUTION:

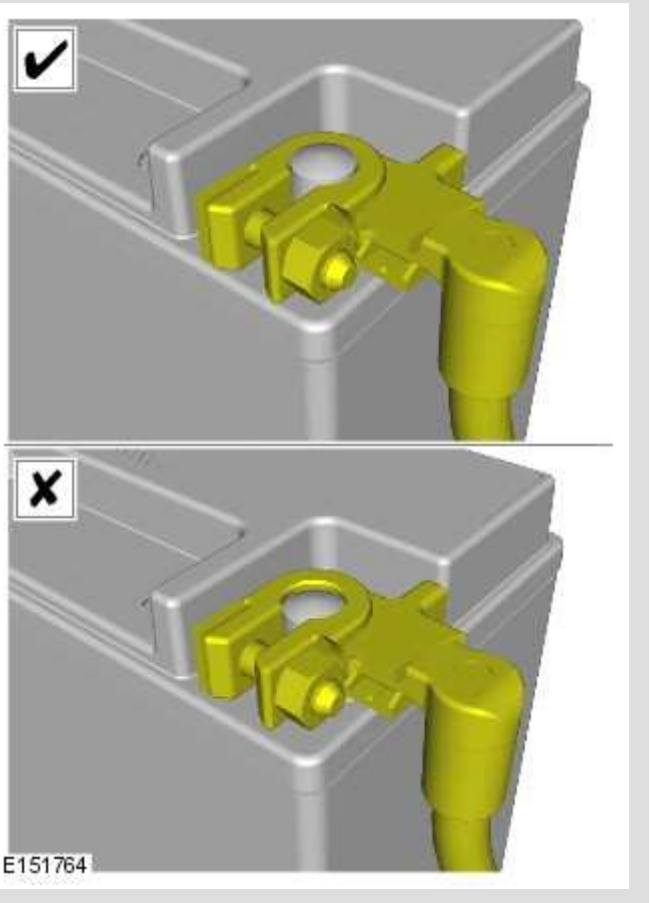
Take extra care not to damage the wiring harnesses.

cardiagn.com



Torque: **6 Nm**

7.



8. To install, reverse the removal procedure.

cardiagn.com

9. **NOTE:**

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

FENDER SPLASH SHIELD (G1580215)

REMOVAL AND INSTALLATION

76.10.90	FRONT WHEEL ARCH LINER - RENEW	ALL DERIVATIVES	0.4	USED WITHINS	

76.10.90	FRONT WHEEL ARCH LINER - RENEW	SVR	0.4	USED WITHINS	

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- LH illustration shown, RH is similar.

1. **WARNING:**

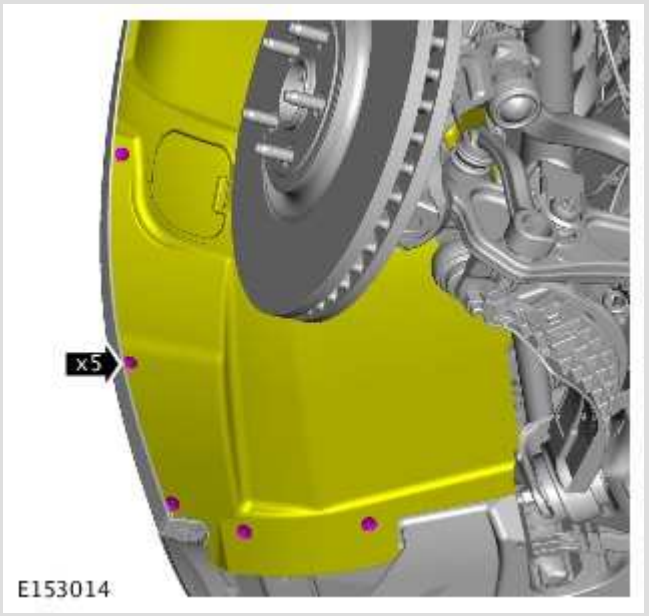
   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

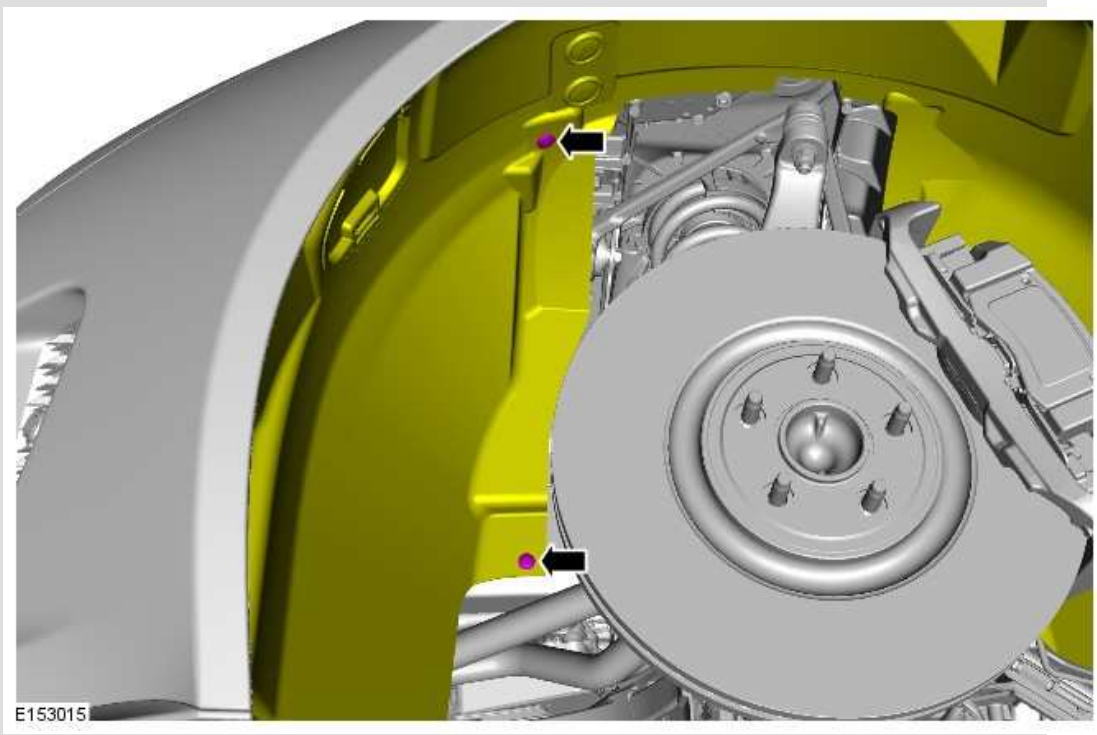
2. Refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

3.

cardiagn.com

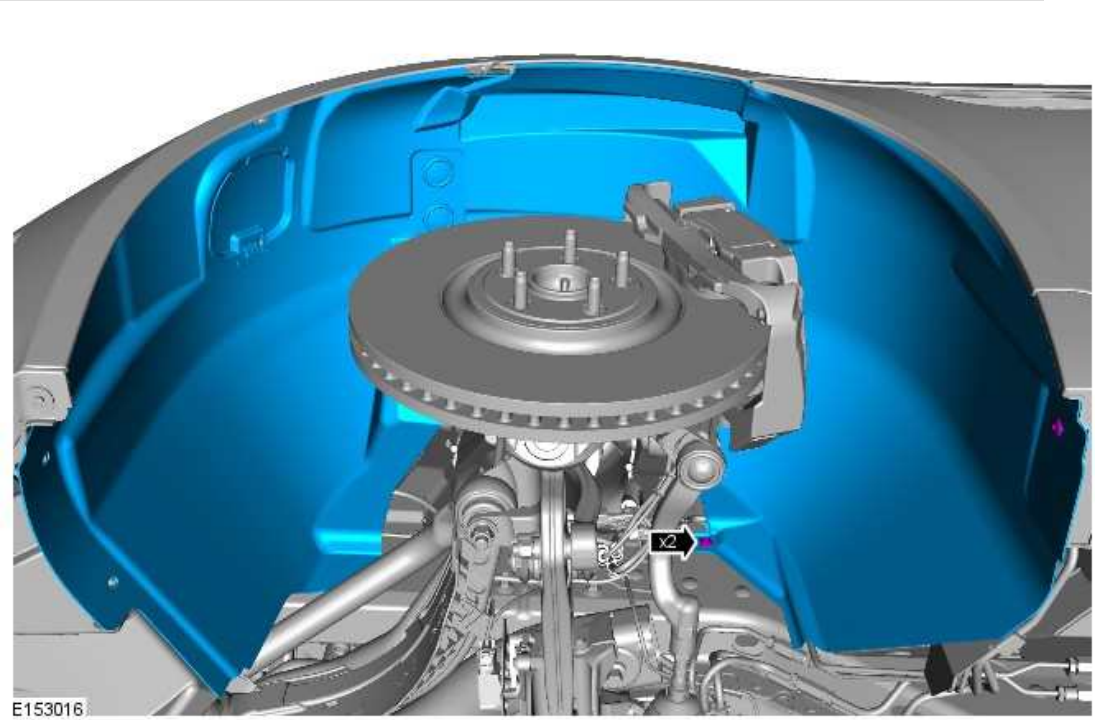


4.



5.

cardiagn.com



INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

AIR CLEANER OUTLET PIPE RH (G1580351)

REMOVAL AND INSTALLATION

19.10.36	AIR CLEANER OUTLET PIPE - RIGHT HAND - RENEW	ALL DERIVATIVES	0.6	USED WITHINS	

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

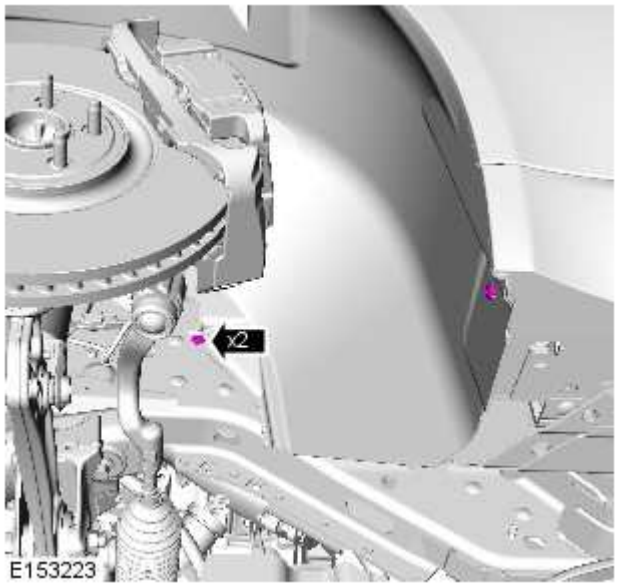
3. Refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

cardiagn.com

4.

NOTE:

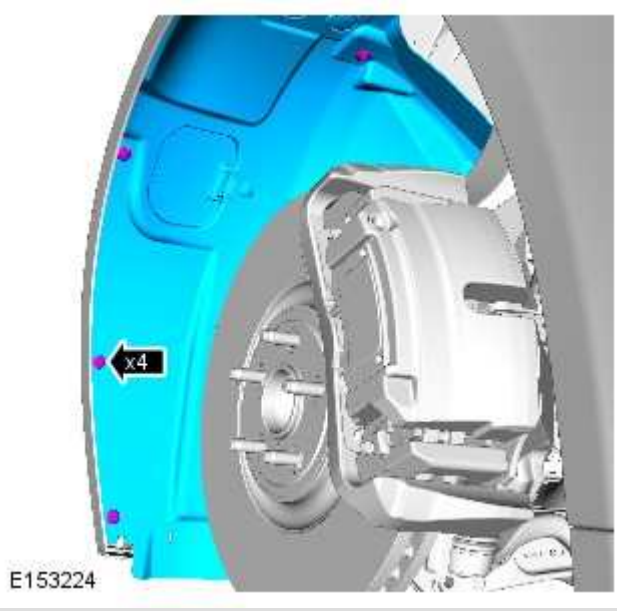
LH illustration shown, RH is similar.



5.

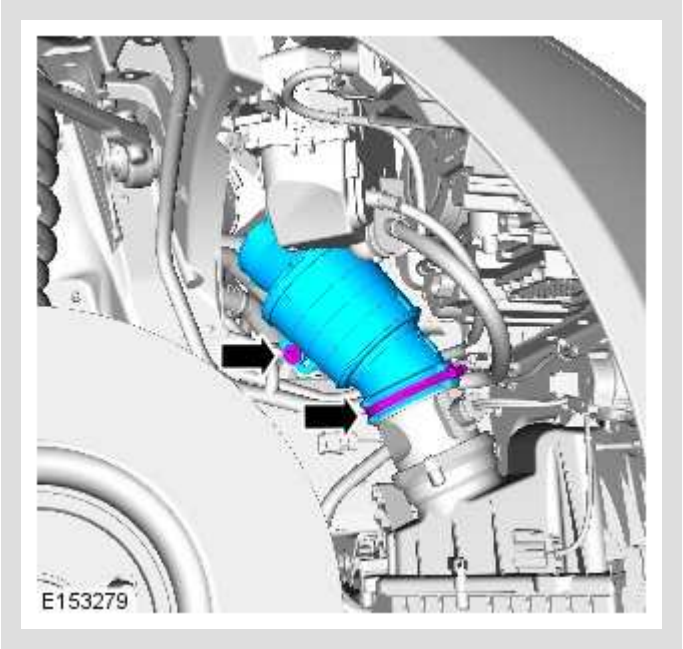
NOTE:

LH illustration shown, RH is similar.



cardiagn.com

6.



Torque:

M6 **9 Nm**

Clamp **3.3 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

TRANSMISSION (G1579985)

INSTALLATION

37.20.01	TRANSMISSION ASSEMBLY -	3000 CC, AJ V6	3.6	USED	

	RENEW	(AJ126)		WITHINS	
44.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	4.9	USED WITHINS	
44.20.01.90	TRANSMISSION ASSEMBLY - REMOVE FOR ACCESS, AND INSTALL	3000 CC, AJ V6 (AJ126), 2WD	4.7	USED WITHINS	
86.75.50	FRONT SEAT TRACK MOTOR - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	

INSTALLATION

SPECIAL TOOL(S)

303-021

Engine support bracket

cardiagn.com

303-1435

Engine Lifting Brackets Rear

NOTES:

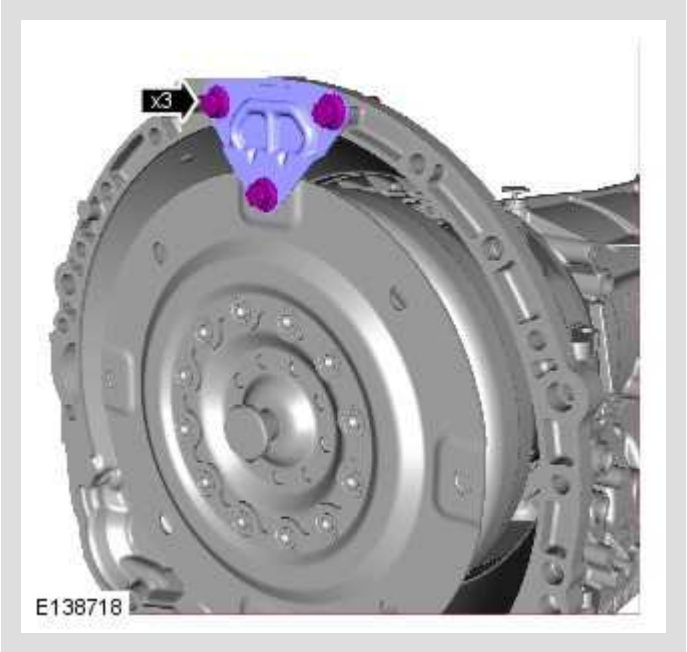
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the transmission removed for clarity.

1.

NOTE:

This step is only required if a new component is installed.

cardiagn.com



2.

NOTE:

Make sure that the torque converter is fully engaged to the transmission.

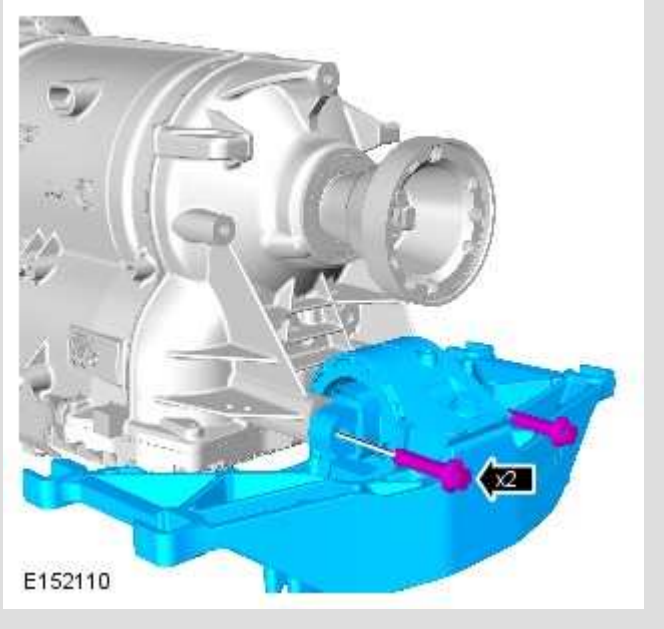
cardiagn.com

3.

cardiagn.com

NOTE:

This step is only required if previously removed.



Torque: **48 Nm**

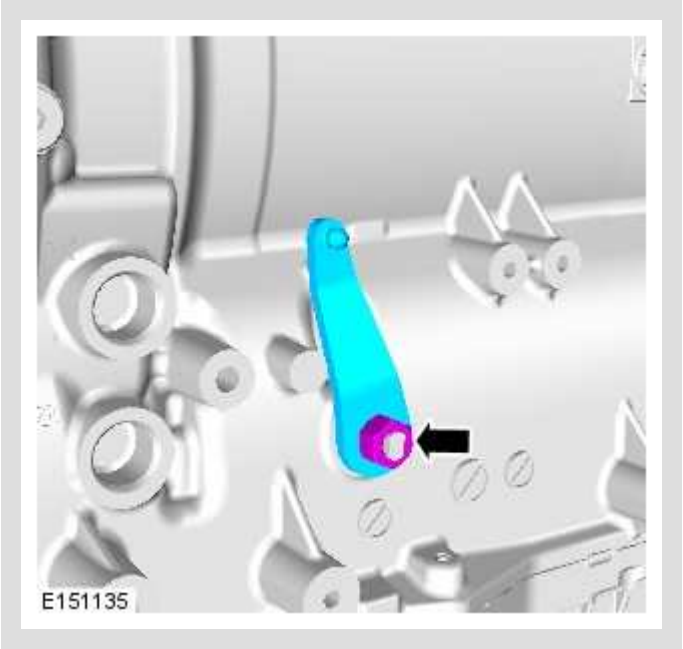
4.

5.

cardiagn.com

NOTE:

This step is only required if a new component is installed



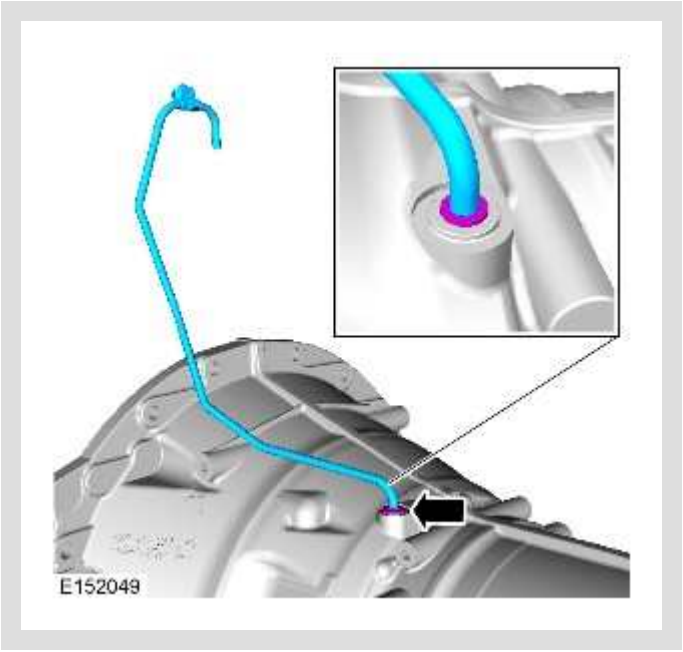
Torque: **12 Nm**

6.

CAUTION:

To prevent water ingress and subsequent transmission damage, make sure that the breather is fully pushed home into the transmission casing. The white line around the circumference of the pipe should not be visible when correctly installed.

cardiagn.com



7.

WARNINGS:

This step requires the aid of another technician.

Make sure that the transmission is secured with suitable retaining straps.

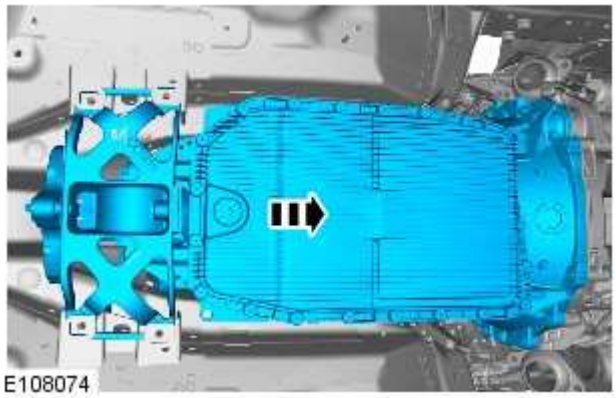
cardiagn.com

CAUTIONS:

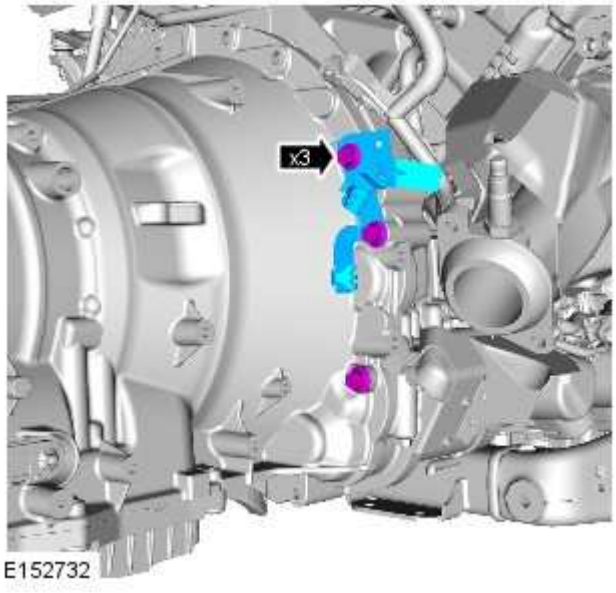
Make sure that the torque converter remains in the transmission.

Remove and discard the cable ties securing the torque converter.

Apply grease of the correct specification to the torque converter spigot.



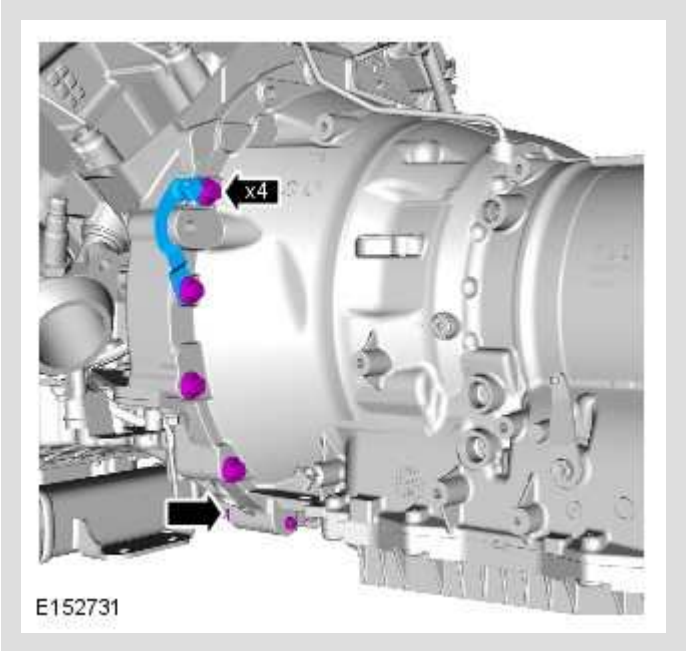
8.



Torque: **48 Nm**

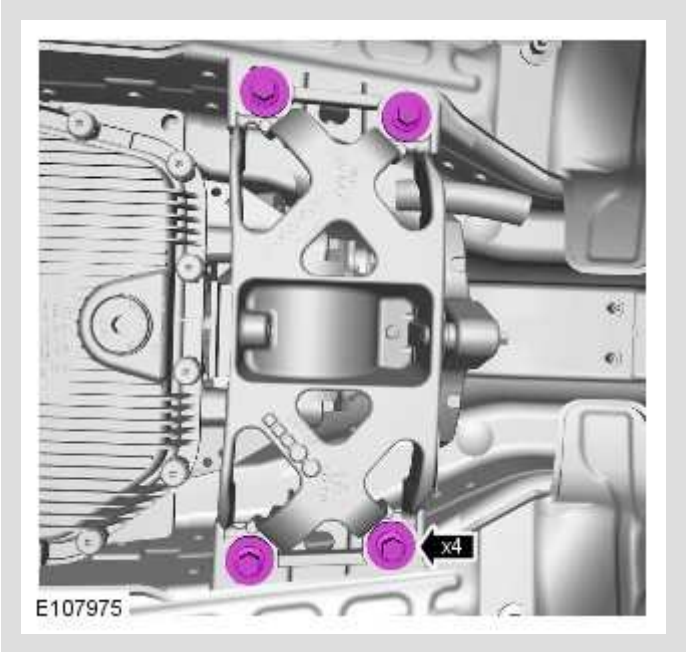
9.

cardiagn.com



Torque: **48 Nm**

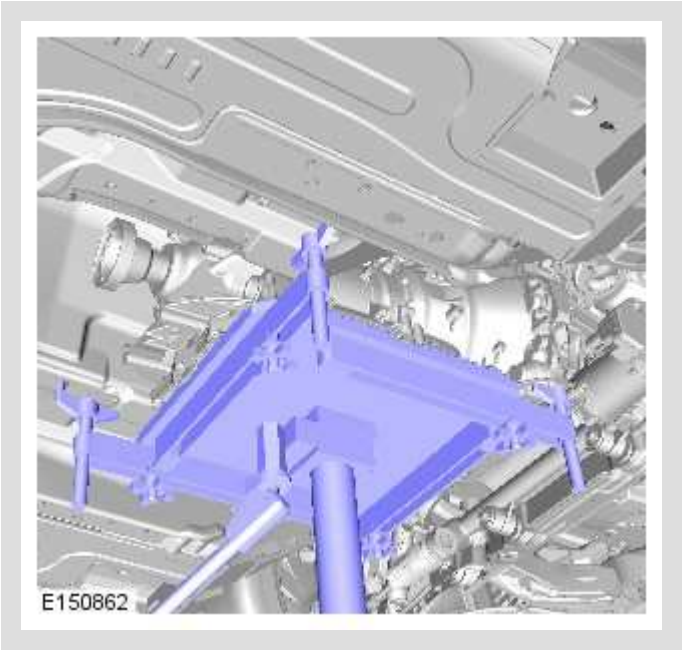
10.



Torque: **45 Nm**

11.

cardiagn.com



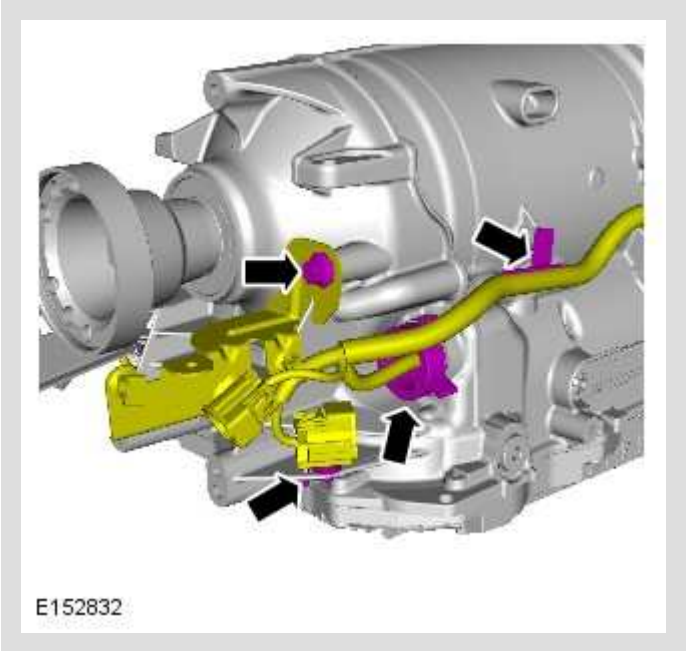
Remove the jack supporting the transmission.

12.

CAUTION:

If necessary, install new clips.

cardiagn.com



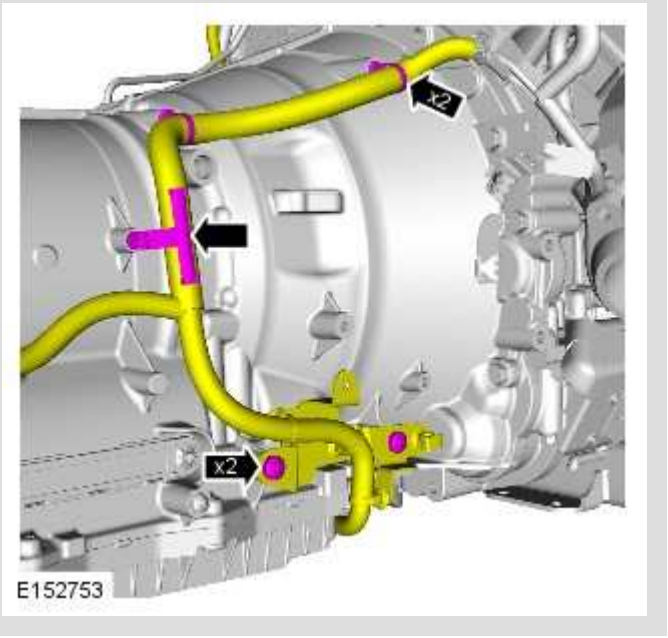
Torque: **15 Nm**

13.

CAUTION:

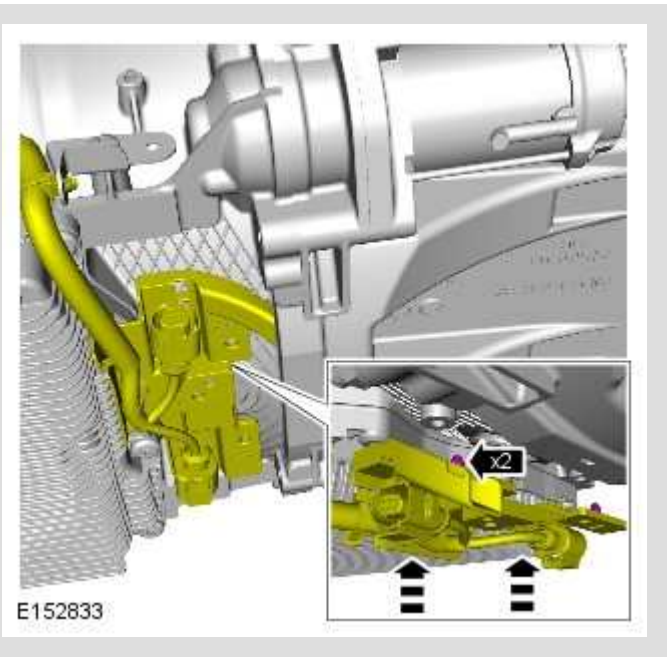
If necessary, install new clips.

cardiagn.com



Torque: **15 Nm**

14.

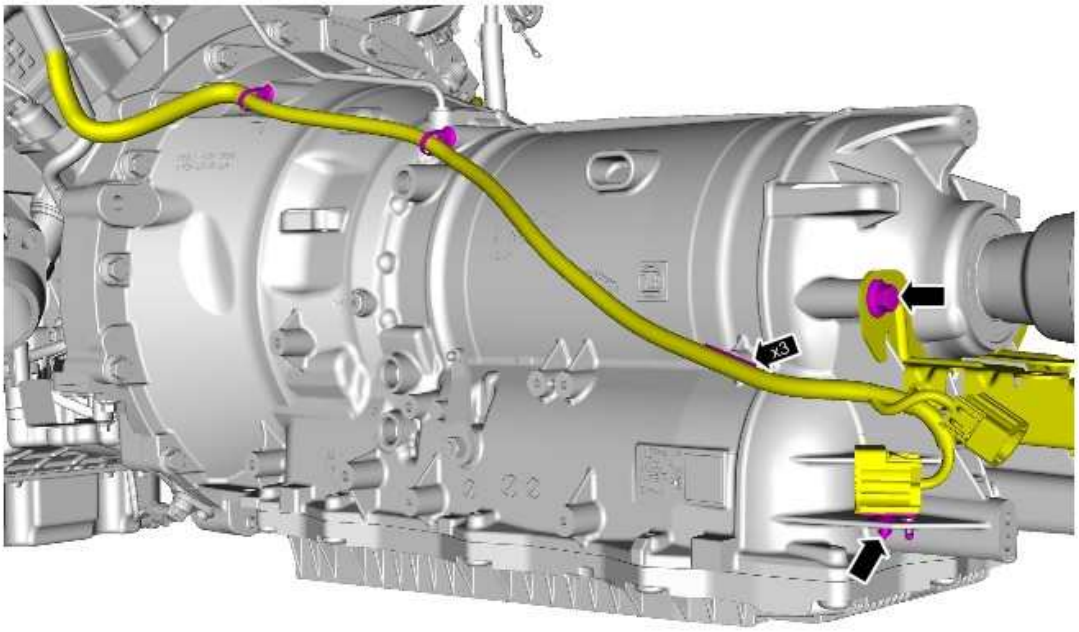


15.

cardiagn.com

CAUTION:

If necessary, install new clips.



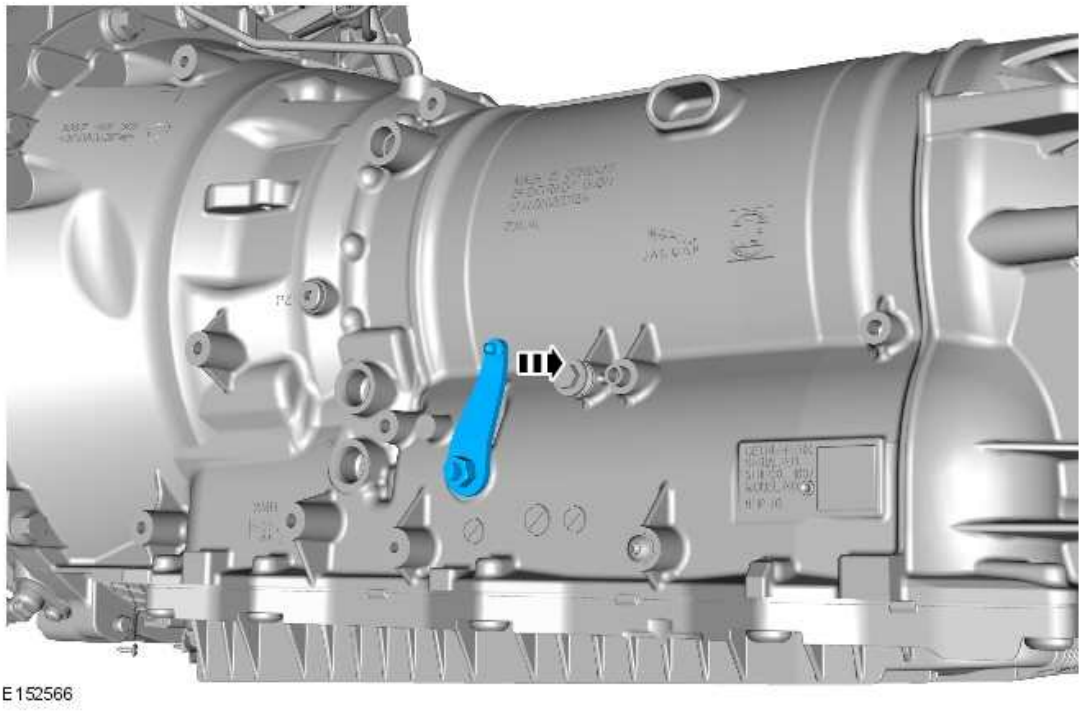
Torque: **12 Nm**

16.

CAUTION:

Secure with a cable tie.

cardiagn.com



17.

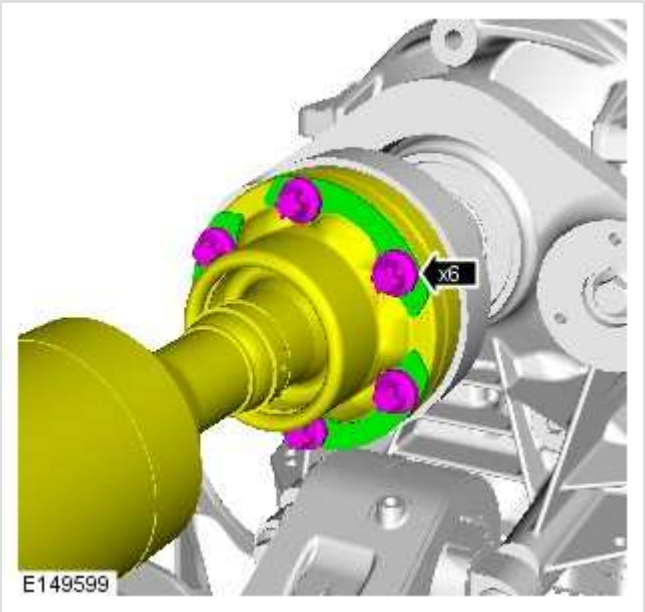
CAUTION:

Make sure that new bolts are installed.

NOTE:

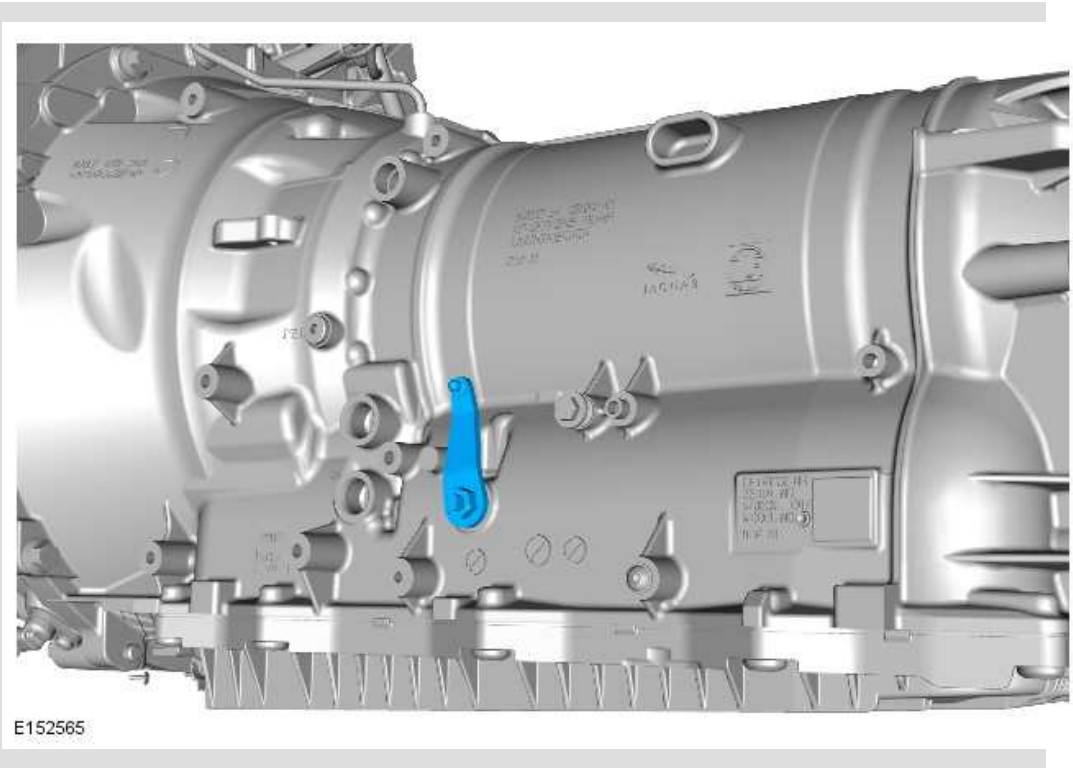
Make sure that you re-align the driveshaft to the transmission flange using the alignment mark.

cardiagn.com



Torque: **75 Nm**

18.



CAUTION:

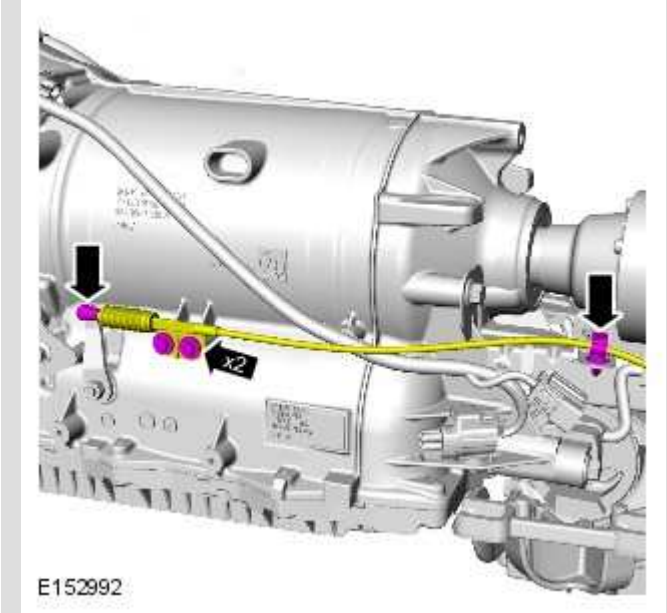
Remove the cable tie.

cardiagn.com

19.

CAUTION:

If necessary, install new clip.



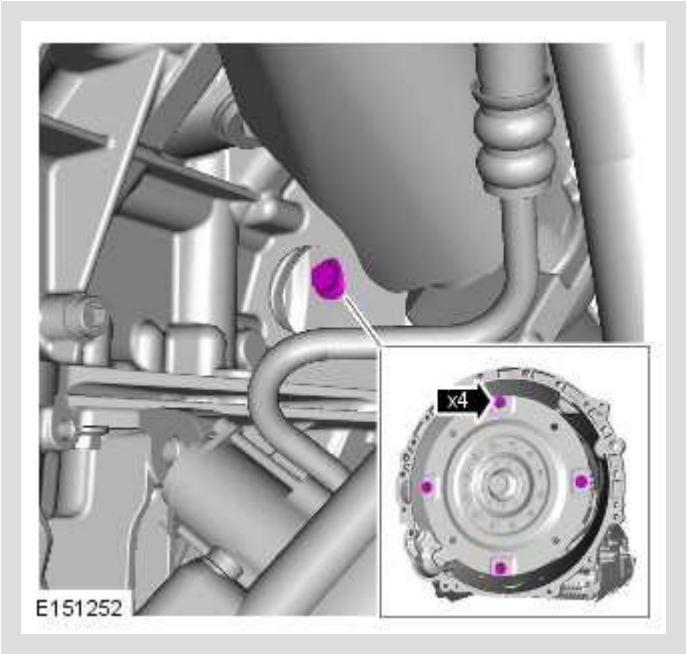
Torque: **11 Nm**

20.

CAUTIONS:

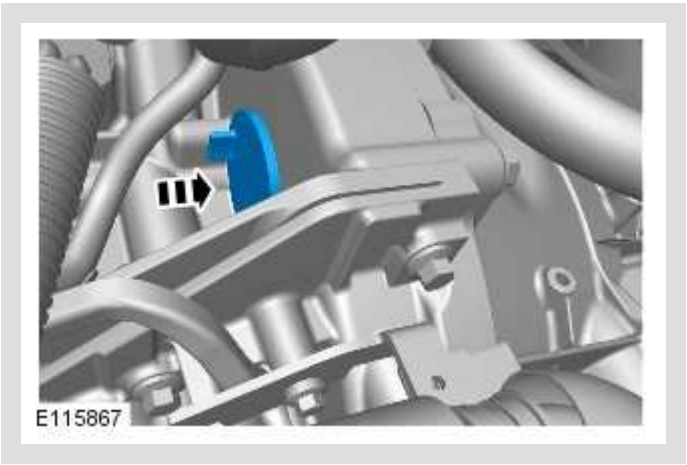
- Only rotate the crankshaft clockwise.
- Make sure that new bolts are installed.

cardiagn.com



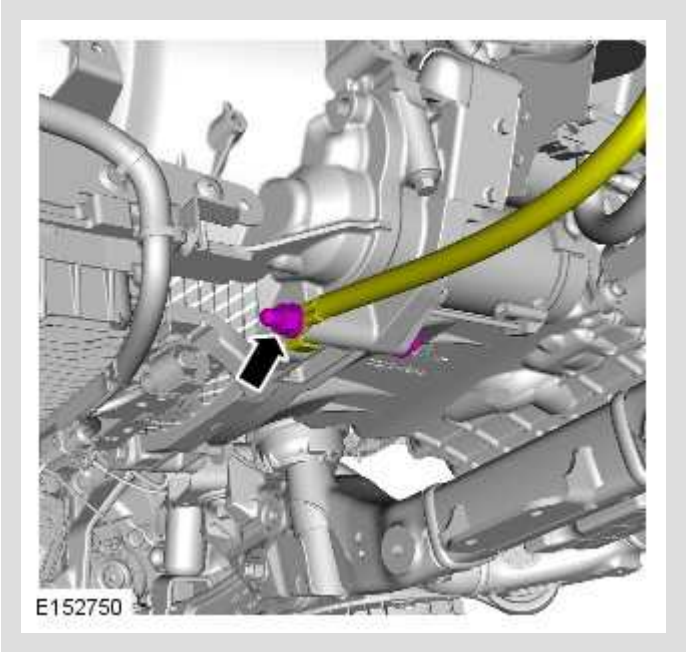
Torque: **63 Nm**

21.



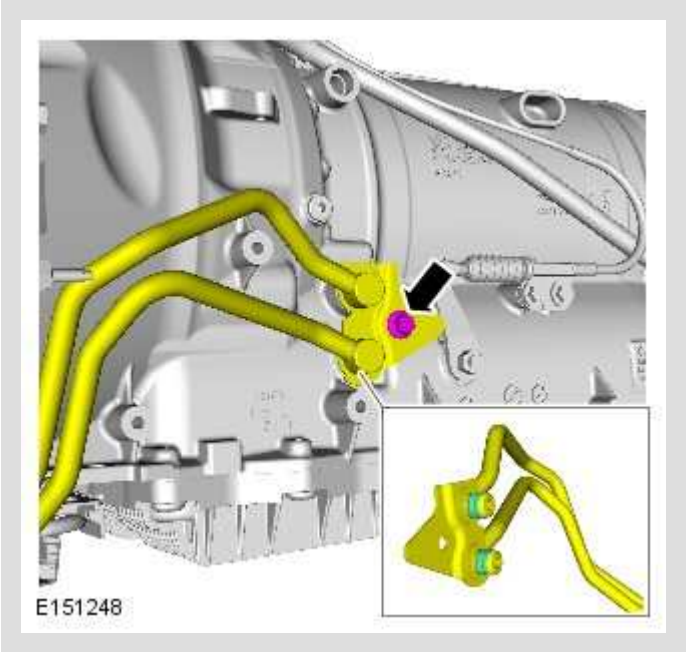
22.

cardiagn.com



Torque: **48 Nm**

23.



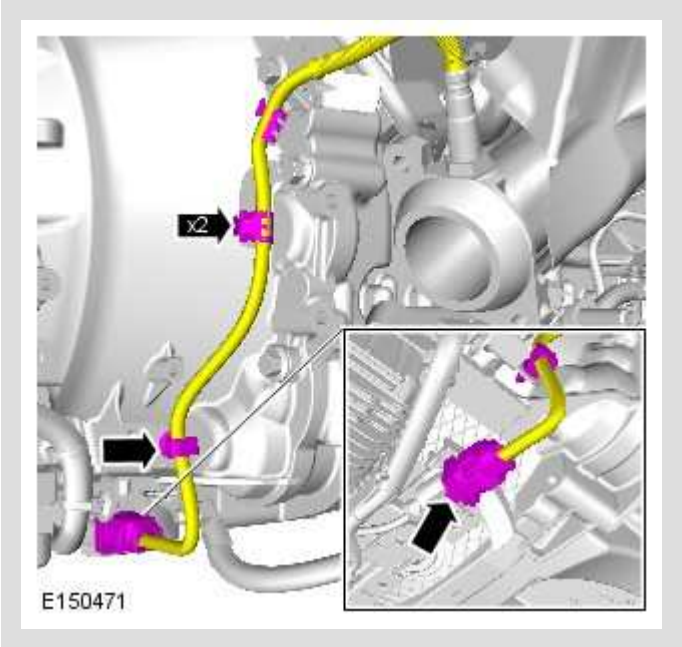
Torque: **22 Nm**

24.

CAUTION:

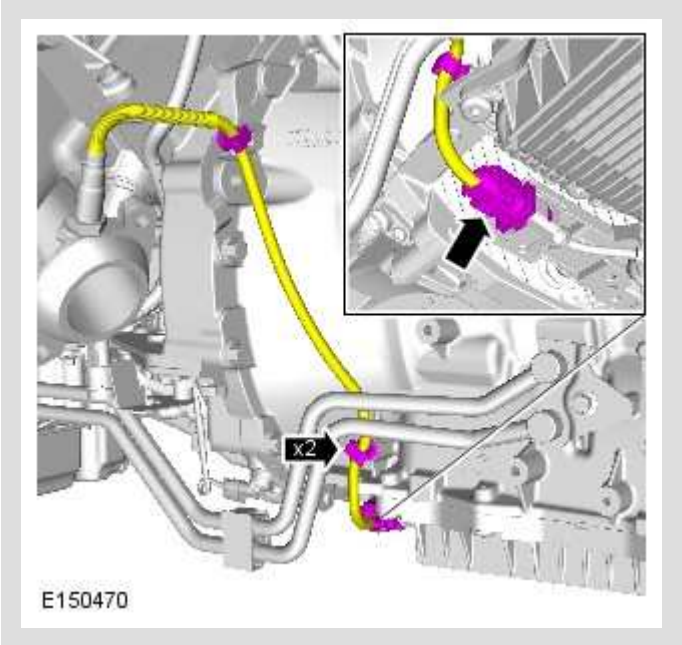
If necessary, install new clip.

cardiagn.com



25. **CAUTION:**

If necessary, install new clips.

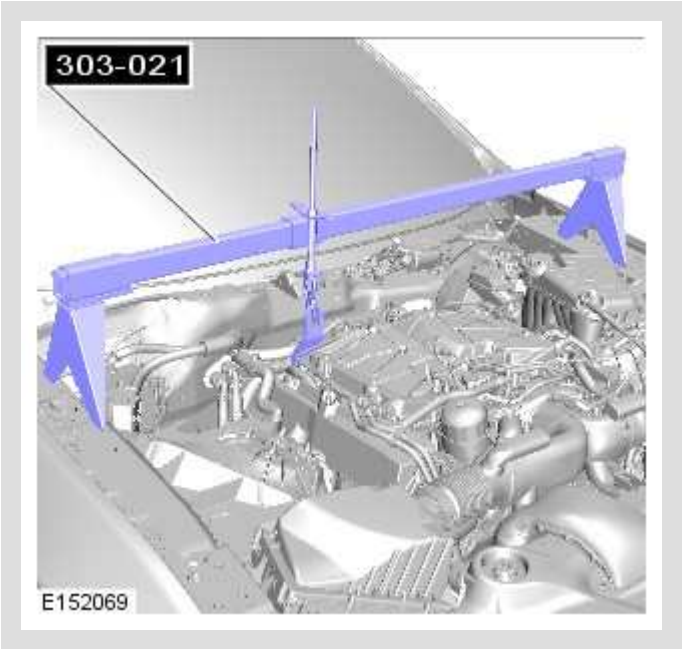


26. Refer to: Catalytic Converter LH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

cardiagn.com

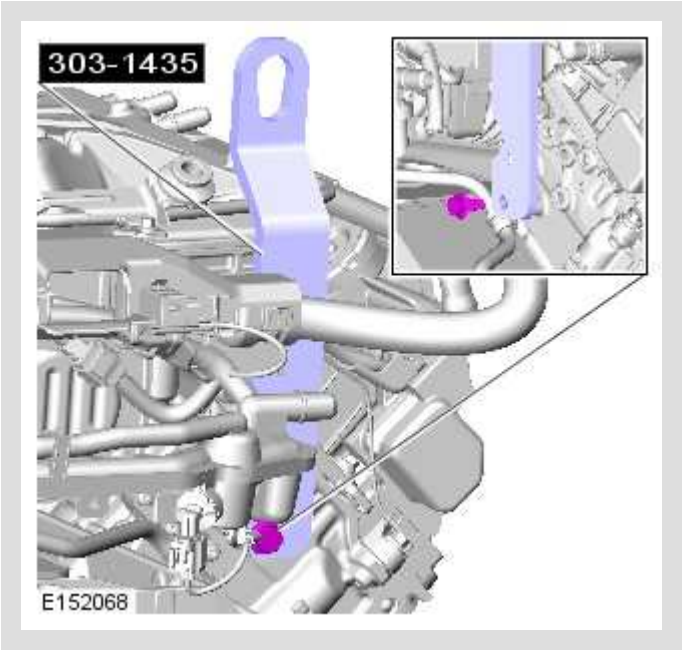
Refer to: Catalytic Converter RH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

27.



Special Tool(s): 303-021

28.



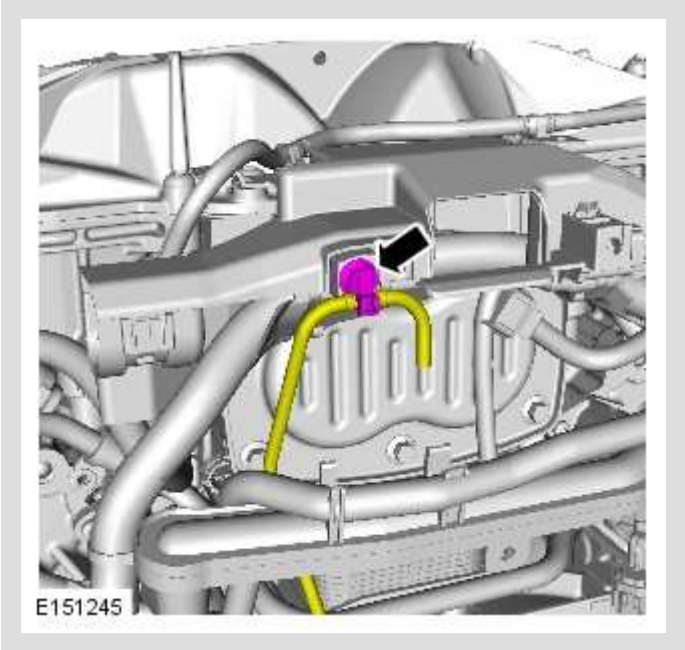
Special Tool(s): 303-1435

29.

cardiagn.com

Torque: **48 Nm**

30.



31. Refer to: Cowl Panel (501-02 Front End Body Panels, Removal and Installation).

32. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

33.

cardiagn.com

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

34. Refer to: Transmission Fluid Level Check (307-01B Automatic Transmission/Transaxle - V8 S/C 5.0L Petrol, General Procedures).

2015.0 F-TYPE (X152), 211-00

STEERING SYSTEM - GENERAL INFORMATION

POWER STEERING SYSTEM FILLING (G1580162)

GENERAL PROCEDURES

57.15.02	LUBRICATION SYSTEM - DRAIN AND REFILL	ALL DERIVATIVES	0.8	USED WITHINS

DRAINING

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

1.

cardiagn.com

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

4. Using a syringe, remove the PAS fluid from the reservoir.

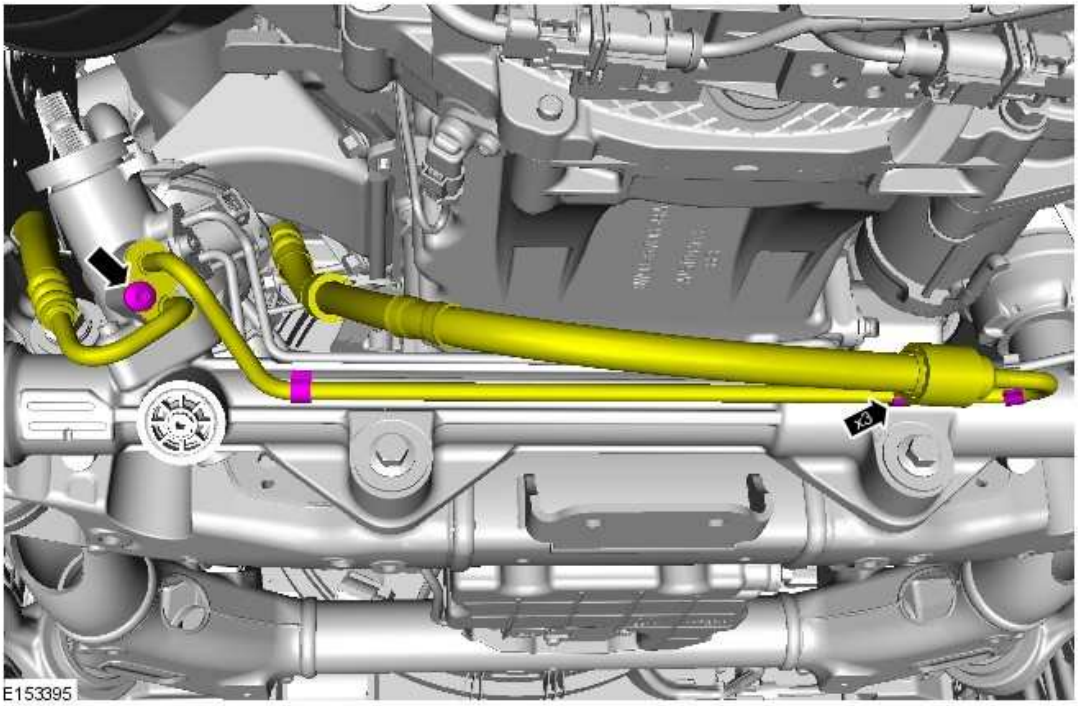
5. **CAUTIONS:**

   - Make sure that the area around the component is clean and free of foreign material.
   - Be prepared to collect escaping fluids.
   - Discard the o-ring seals.

cardiagn.com

NOTE:

LH illustration shown, RH is similar.



FILLING

1.

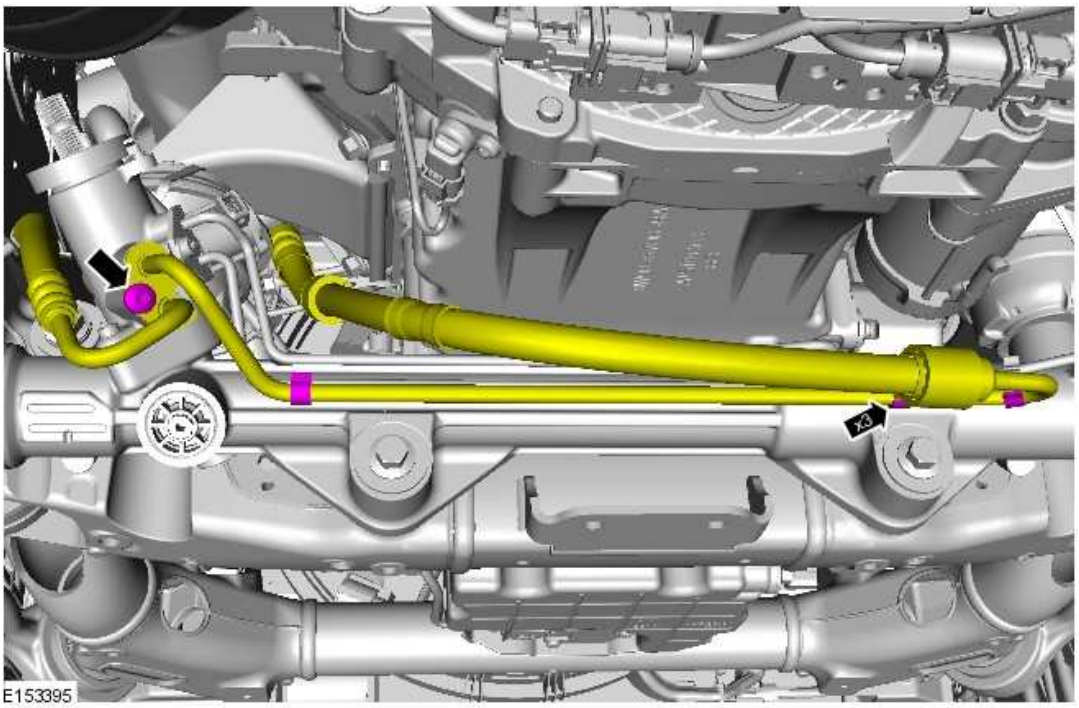
CAUTION:

Install new o-ring seals.

NOTES:

- Make sure that the component is clean, free of foreign material and lubricant.
- LH illustration shown, RH is similar.

cardiagn.com

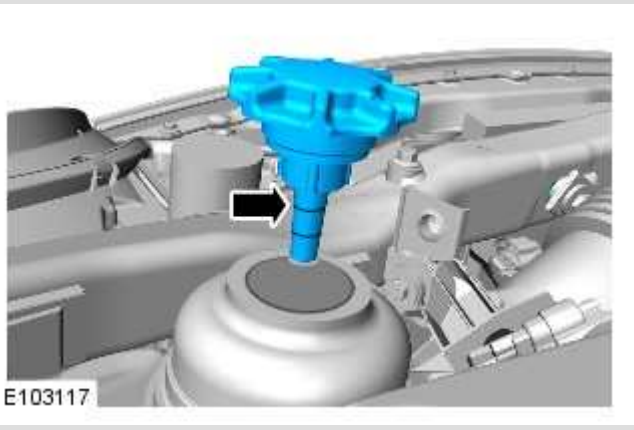


Torque: **15 Nm**

2.

CAUTION:

Fluid must always be present in the reservoir during bleeding.



Fill the power steering reservoir.

cardiagn.com

3. Install the vacuum hand pump to the power steering fluid reservoir.

4. **NOTE:**

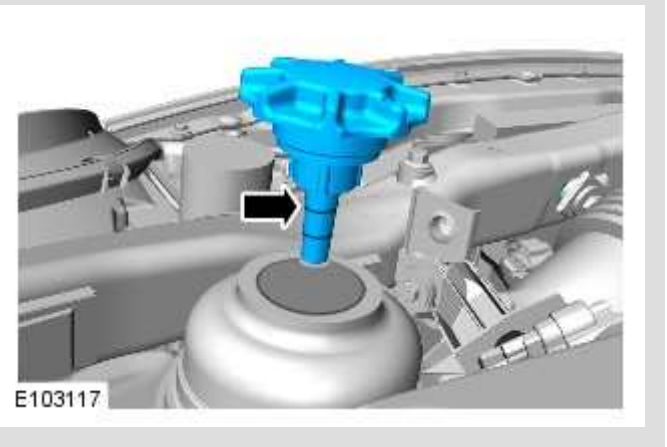
Apply the maximum vacuum possible on the reservoir for 1 minute.

Apply a vacuum to the power steering fluid reservoir.

5. Remove the vacuum hand pump from the power steering fluid reservoir.

6. **CAUTION:**

Fluid must always be present in the reservoir during bleeding.



Fill the power steering reservoir.

7. Run the engine for 30 seconds.

Turn the steering fully lock-to-lock, stop the engine.

cardiagn.com

8. Install the vacuum hand pump to the power steering fluid reservoir.

9. **NOTE:**

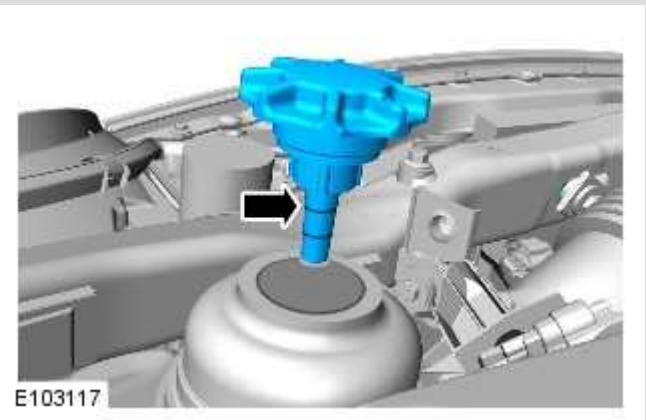
Apply the maximum vacuum possible on the reservoir for 1 minute.

Apply a vacuum to the power steering fluid reservoir.

10. Remove the vacuum hand pump from the power steering fluid reservoir.

11. **CAUTION:**

Fluid must always be present in the reservoir during bleeding.



Fill the power steering reservoir.

12. Run the engine for 30 seconds.

Turn the steering fully lock-to-lock, stop the engine.

cardiagn.com

13. Install the vacuum hand pump to the power steering fluid reservoir.

14. **NOTE:**

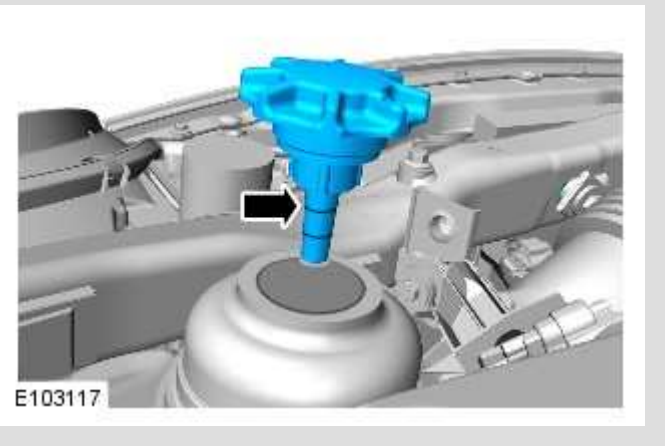
Apply the maximum vacuum possible on the reservoir for 1 minute.

Apply a vacuum to the power steering fluid reservoir.

15. Remove the vacuum hand pump from the power steering fluid reservoir.

16. **CAUTION:**

Fluid must always be present in the reservoir during bleeding.



Fill the power steering reservoir.

17. Run the engine for 30 seconds.

Turn the steering fully lock-to-lock, stop the engine.

cardiagn.com

18. Install the power steering fluid reservoir cap.

19. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

20. Lower the vehicle.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

LOWER TIMING COVER (G1584124)

REMOVAL AND INSTALLATION

12.66.03	TIMING COVER - LOWER - RENEW	ALL DERIVATIVES	4.9	USED WITHINS

SPECIAL TOOL(S)

303-1433

Lower Timing Cover Alignment tool

REMOVAL

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2. **WARNING:**

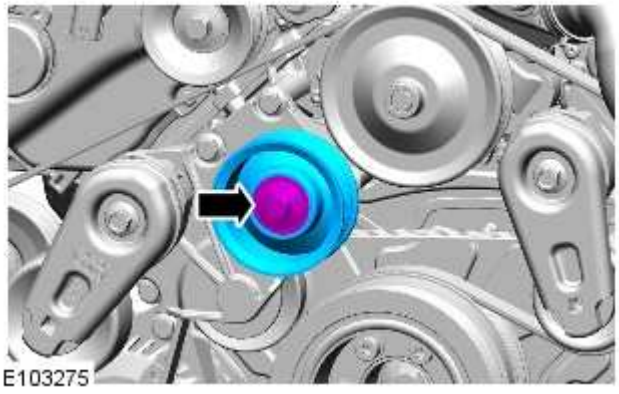
Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

3. Refer to: Crankshaft Pulley (303-01 Engine - V8 S/C 5.0L Petrol, Removal and Installation).

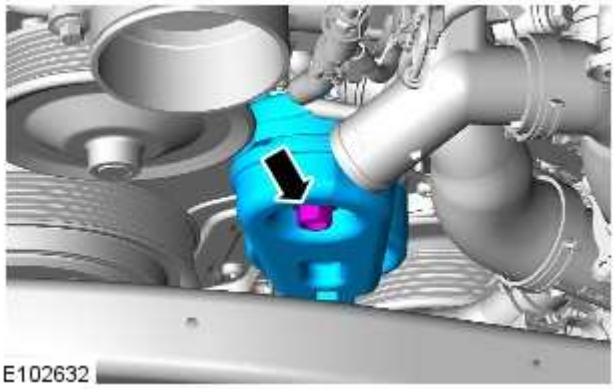
4.

5.

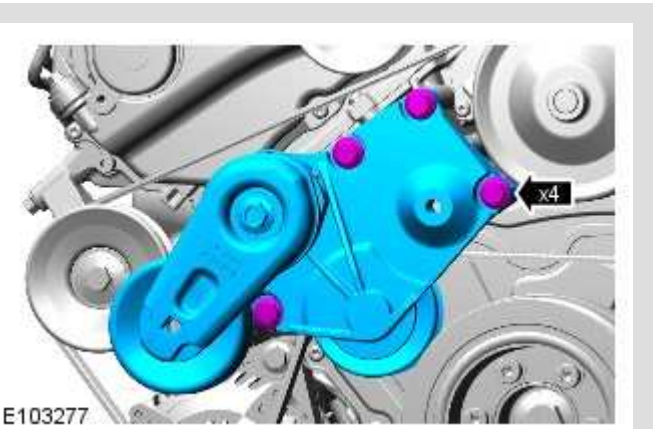


6.

cardiagn.com



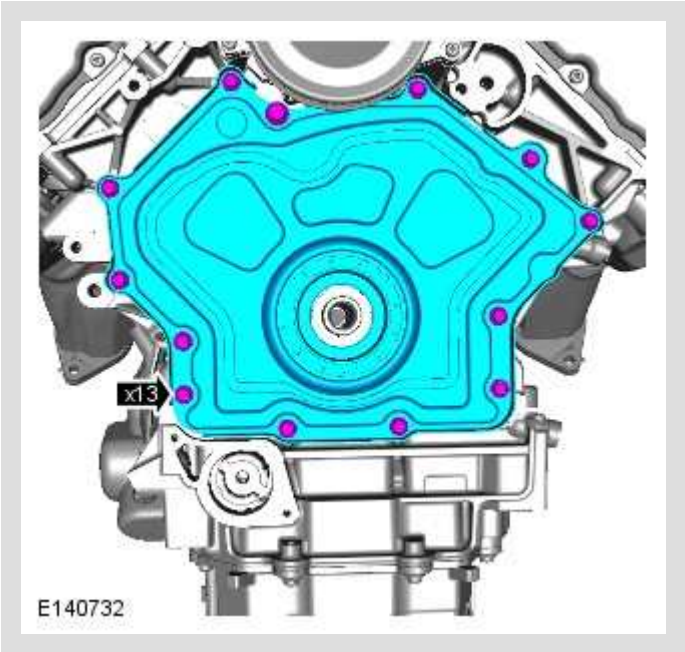
7.



8. Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

9.

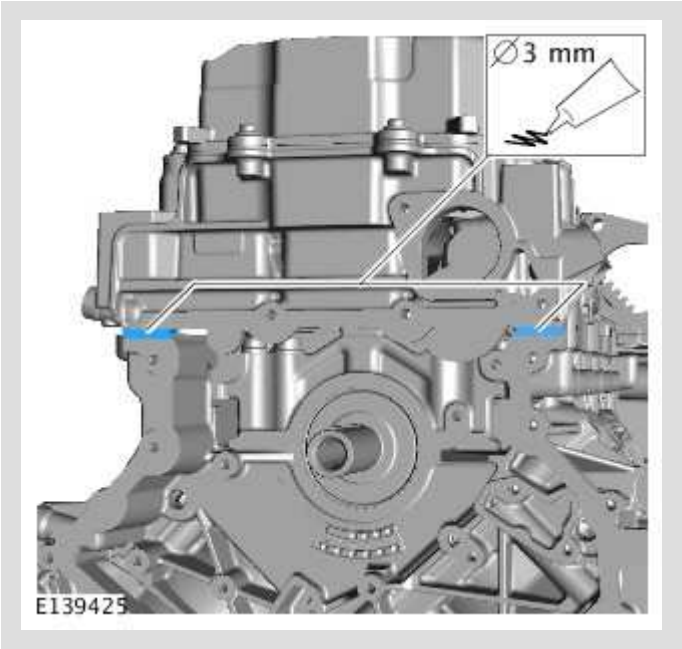
cardiagn.com



INSTALLATION

1.

cardiagn.com



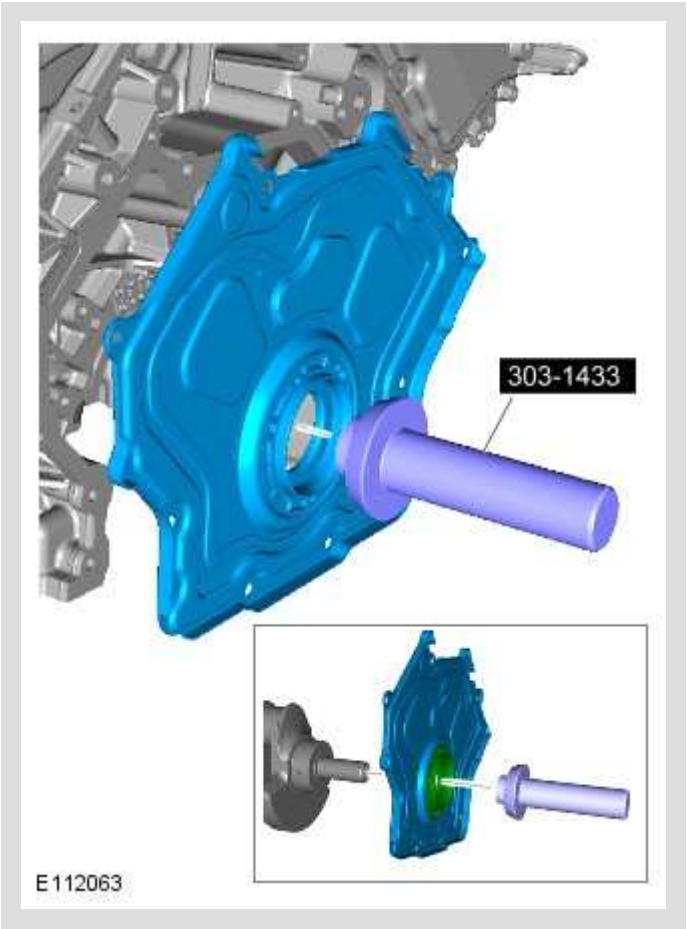
Apply RTV sealant WSE-M4G323-A6 (Loctite 5901G or Loctite 5900) to the areas shown, and tighten the bolts within 7 minutes.

2.

CAUTION:

Make sure that the mating faces are clean and free of foreign material.

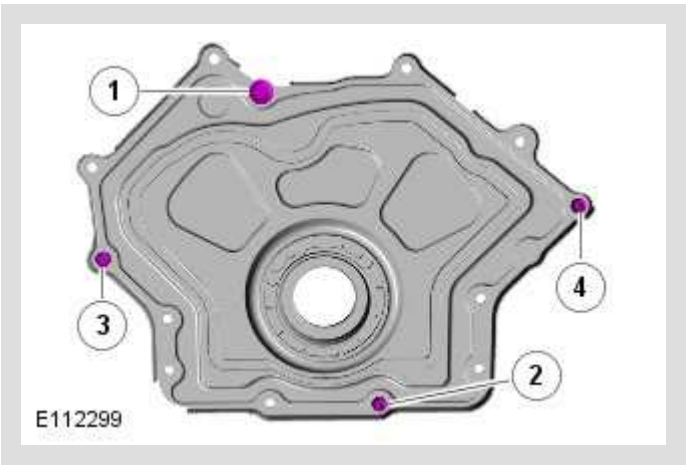
cardiagn.com



Install the bolts, but do not tighten fully at this stage.

Special Tool(s): 303-1433

3.



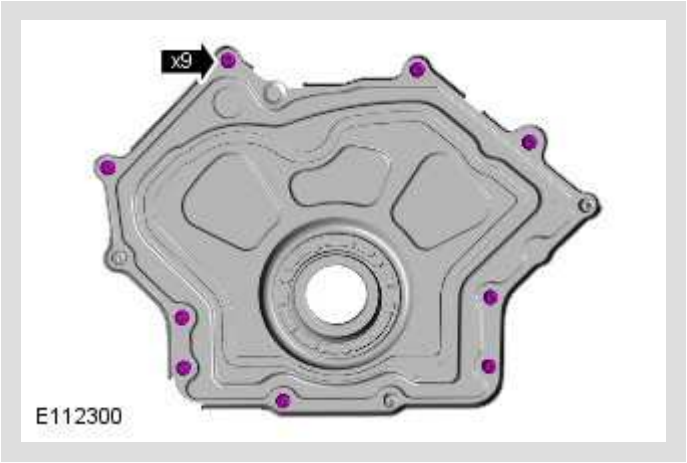
Torque:

M6 **12 Nm**

M8 **20 Nm**

cardiagn.com

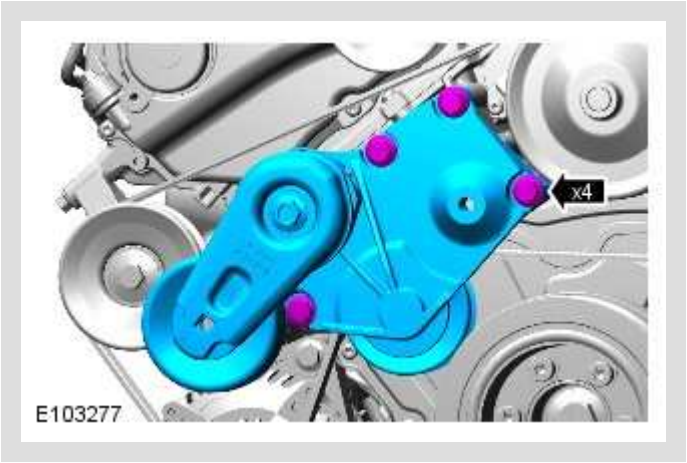
4.



Torque: **12 Nm**

5. Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

6.



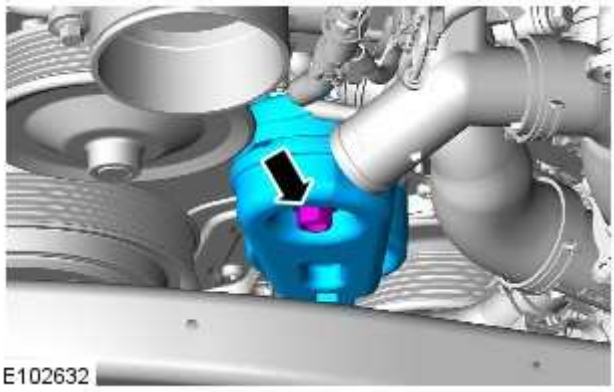
Torque: **25 Nm**

7.

CAUTION:

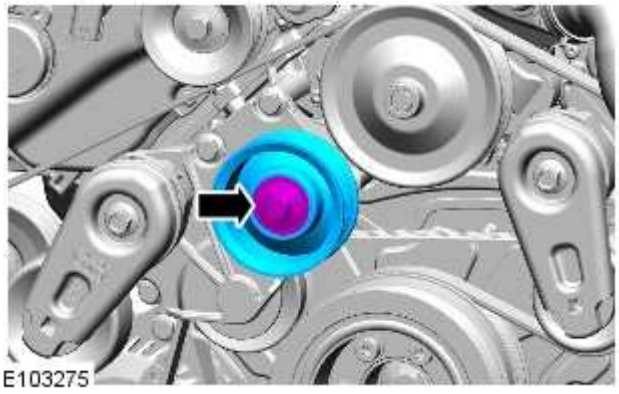
Install all the bolts finger tight before final tightening.

cardiagn.com



Torque: **40 Nm**

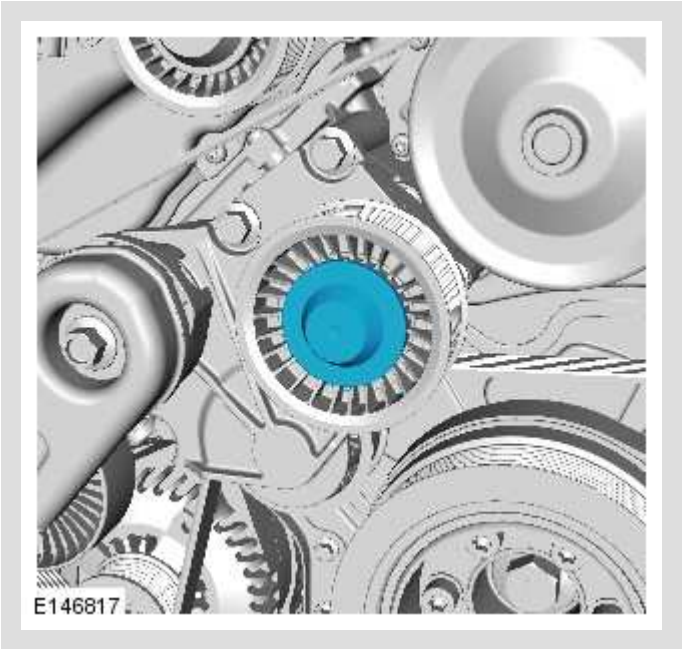
8.



Torque: **40 Nm**

9.

cardiagn.com



10. Refer to: Crankshaft Pulley (303-01 Engine - V8 S/C 5.0L Petrol, Removal and Installation).

11. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

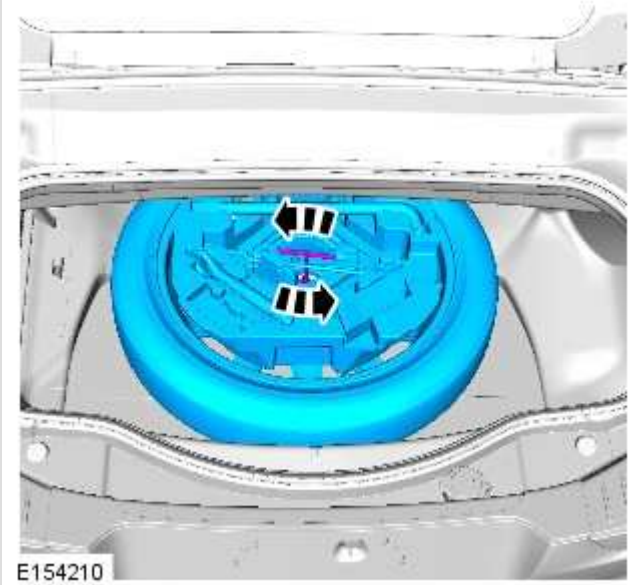
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

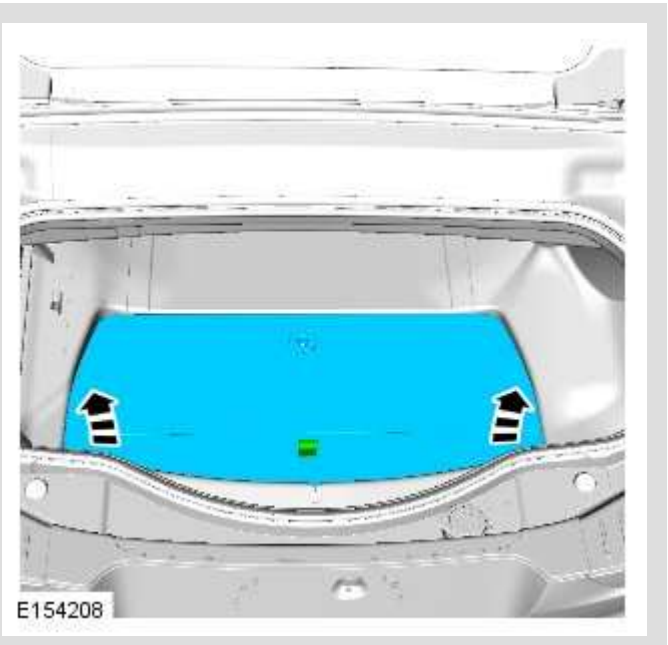
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

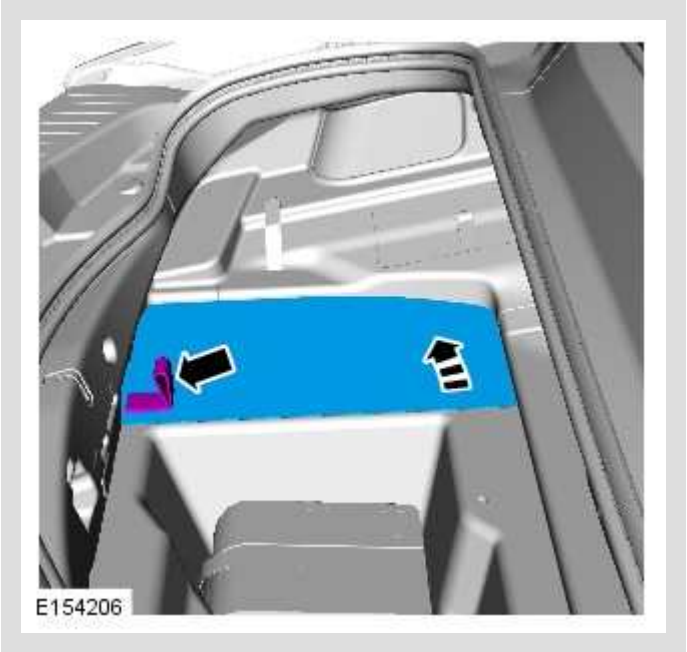

E154210

4.


E154208

5.

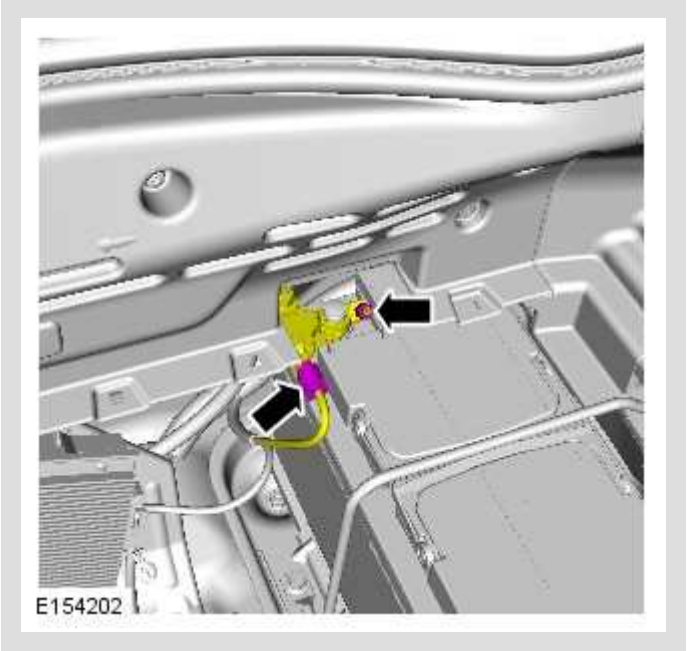
cardiagn.com



6.

CAUTION:

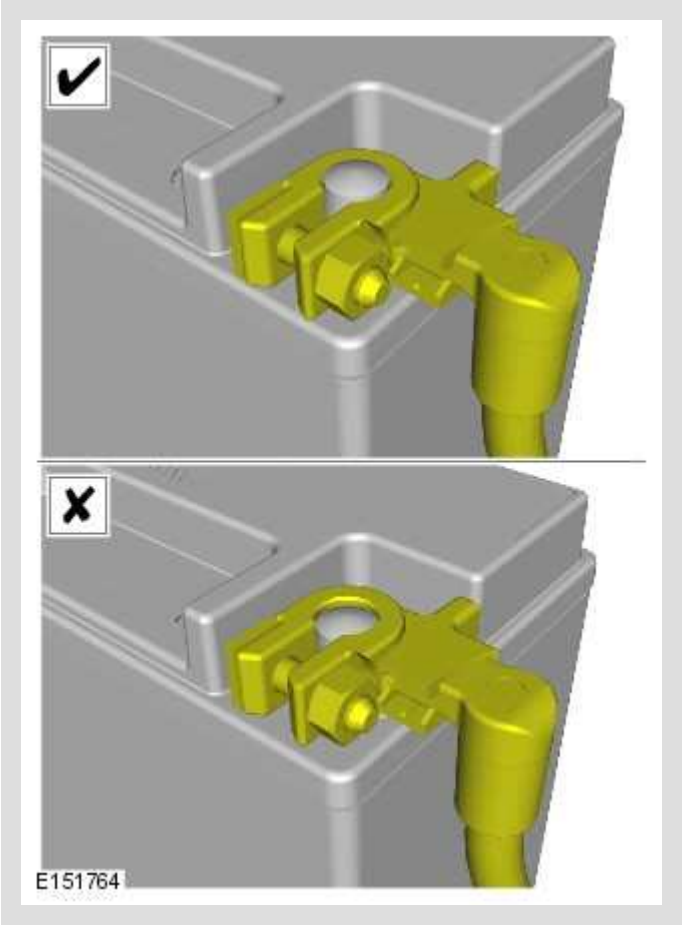
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

2015.0 F-TYPE (X152), 206-07

POWER BRAKE ACTUATION

BRAKE VACUUM PUMP (G1580129)

REMOVAL AND INSTALLATION

70.35.48	VACUUM PUMP - RENEW	ALL DERIVATIVES	0.7	USED WITHINS

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

2.

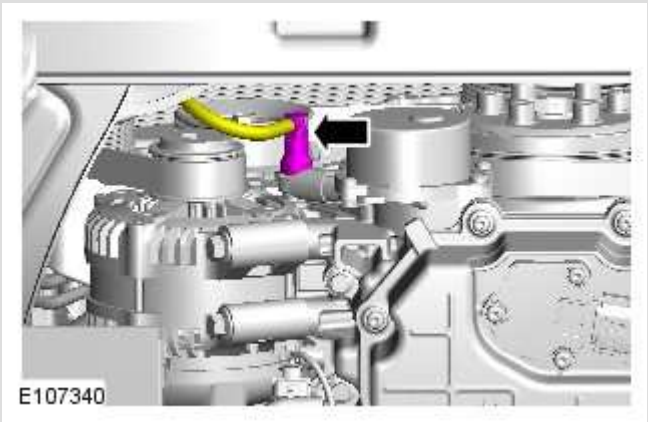
cardiagn.com

Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

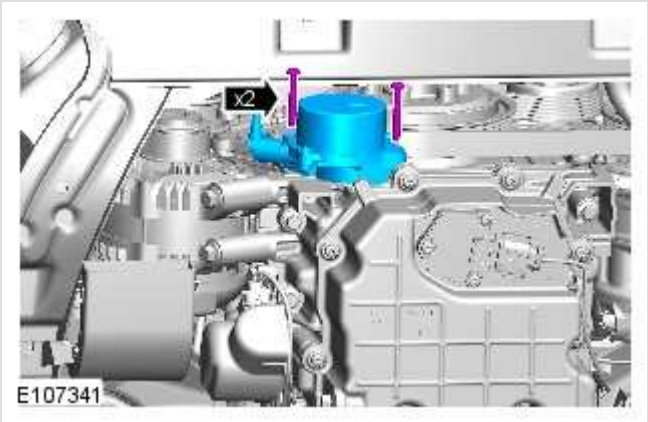
3. Drain the engine oil.
Refer to: Engine Oil Vacuum Draining and Filling (303-01B Engine - V8 S/C 5.0L Petrol, General Procedures).
Refer to: Engine Oil Vacuum Draining and Filling (303-01B Engine - V8 S/C 5.0L Petrol, General Procedures).

4. **NOTE:**

Make sure that all openings are sealed. Use new blanking caps.



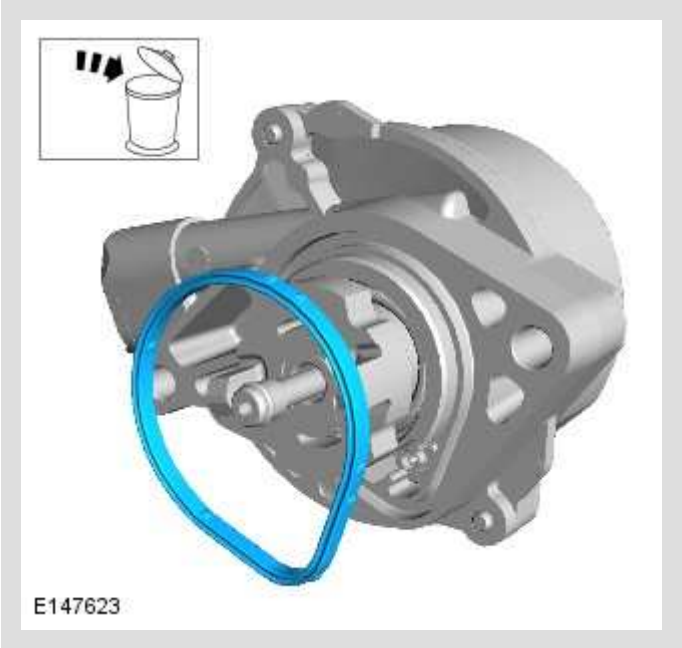
5.



Torque: **12 Nm**

6.

cardiagn.com



INSTALLATION

1. **CAUTION:**

   A new O-ring seal is to be installed.

   To install, reverse the removal procedure.

2. Start engine and check the brake booster operation.

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

OIL COOLER (G1584112)

REMOVAL AND INSTALLATION

12.60.68	OIL COOLER - RENEW	3000 CC, AJ V6 (AJ126)	3.4	USED WITHINS

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

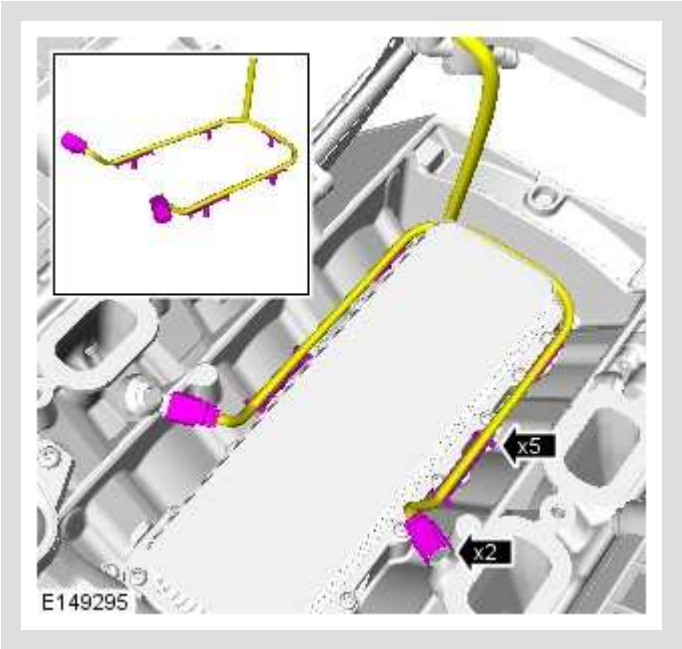
3.

cardiagn.com

Refer to: Cooling System Partial Draining and Vacuum Filling (303-03C Engine Cooling - V8 S/C 5.0L Petrol, General Procedures).

4. Refer to: Supercharger (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

5.

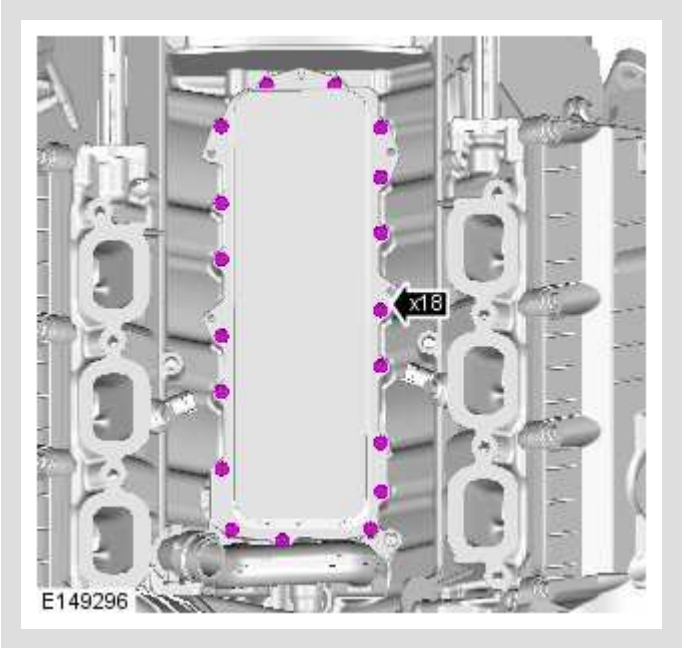


6.

CAUTIONS:

- Be prepared to collect escaping oil.
- Be prepared to collect escaping coolant.

cardiagn.com



7.

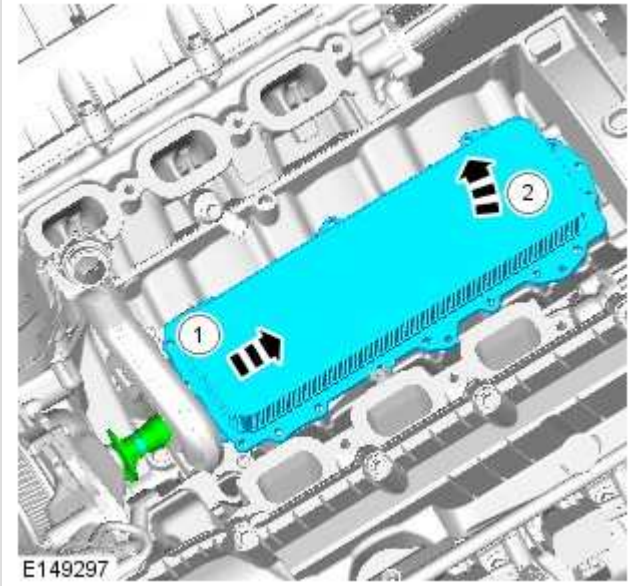
CAUTIONS:

- Make sure that these components are installed to the noted removal position.
- Be prepared to collect escaping oil.
- Be prepared to collect escaping coolant.

NOTE:

Discard the gasket.

cardiagn.com

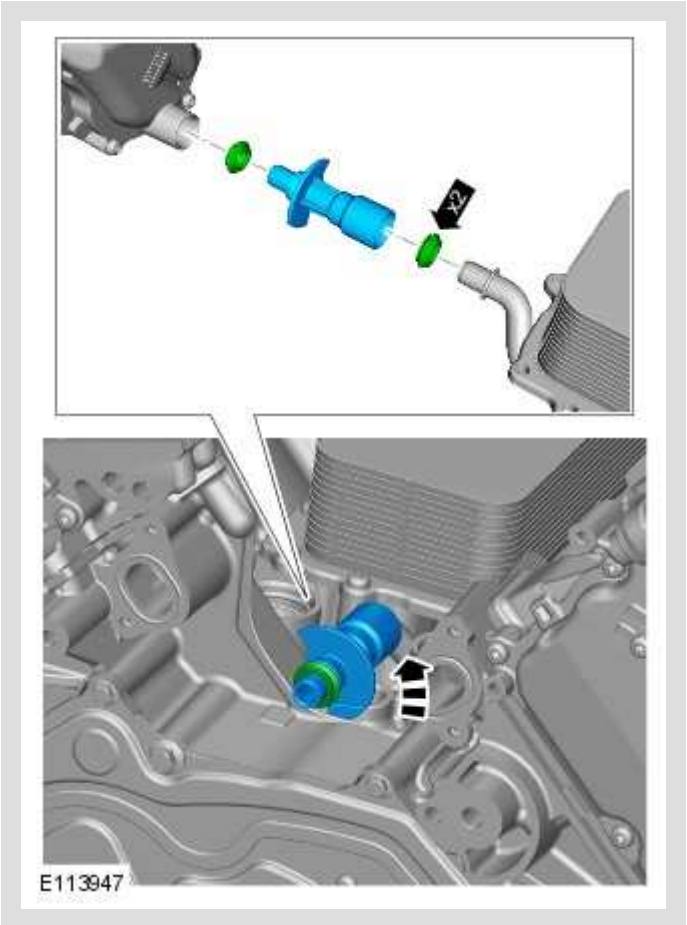


8.

CAUTIONS:

- Make sure that these components are installed to the noted removal position.
- Install new o-ring seals

cardiagn.com



INSTALLATION

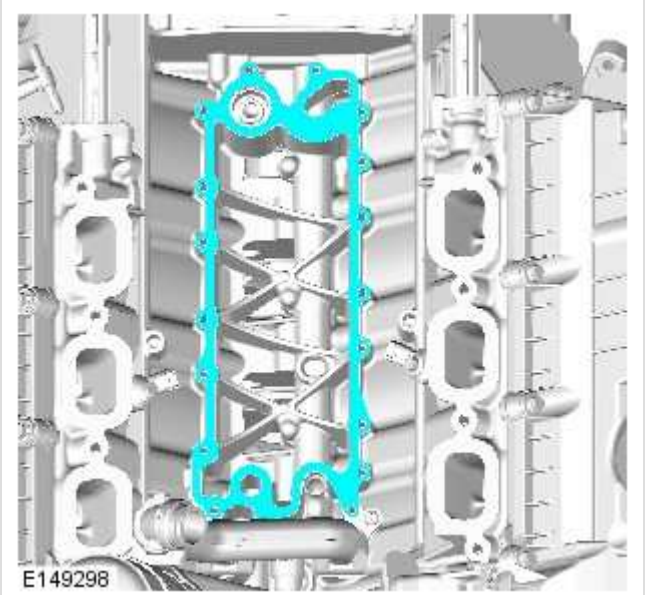
cardiagn.com

1. **CAUTION:**

Make sure that the area around the component is clean and free of foreign material.

NOTE:

Install a new gasket.



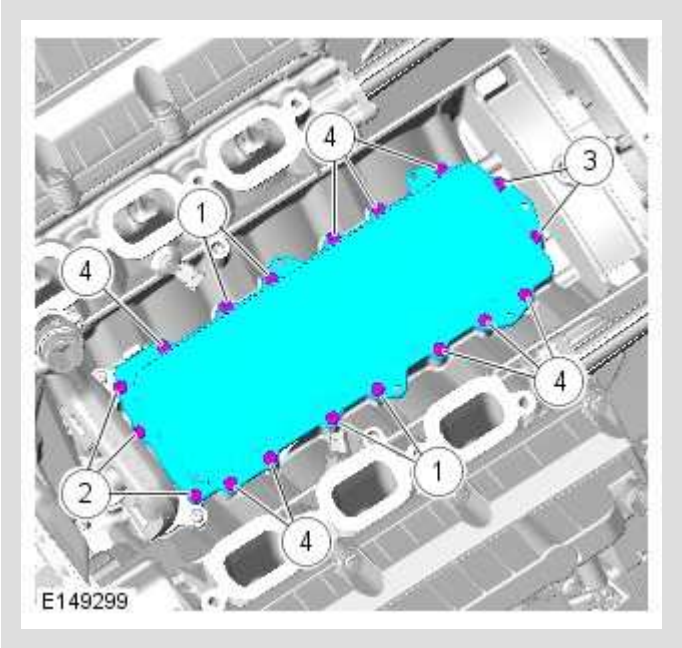
2. **CAUTIONS:**

- Install all the bolts finger tight before final tightening.
- Make sure that the area around the component is clean and free of foreign material.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com



To install, reverse the removal procedure.

Torque: **13 Nm**

cardiagn.com

2015.0 F-TYPE (X152), 303-12

INTAKE AIR DISTRIBUTION AND FILTERING - V6 S/C 3.0L PETROL

SUPERCHARGER (G1580354)

REMOVAL AND INSTALLATION

18.50.15	SUPERCHARGER ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	3.3	USED WITHINS	

SPECIAL TOOL(S)

 E115267	**303-1449-01** Supercharger Installation Guide Pins - Threaded

 E115267	**303-1449-02** Supercharger Installation Guide Pins - Unthreaded

REMOVAL

CAUTION:

If a new cylinder head has been installed, then new taptite bolts must be used to install the supercharger.

NOTES:

- New taptite bolts when used cut their own threads on the first application.
- Some variation in the illustrations may occur, but the essential information is always correct.

cardiagn.com

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

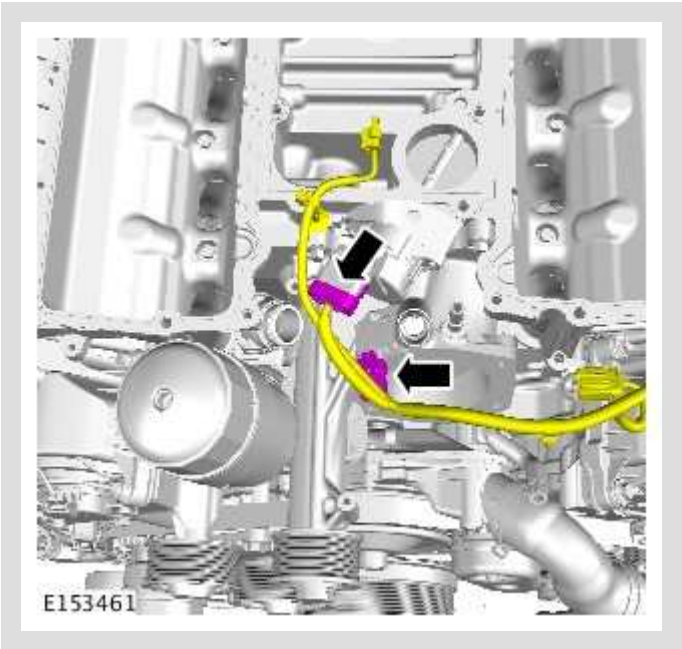
   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

3. Refer to: Charge Air Cooler (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

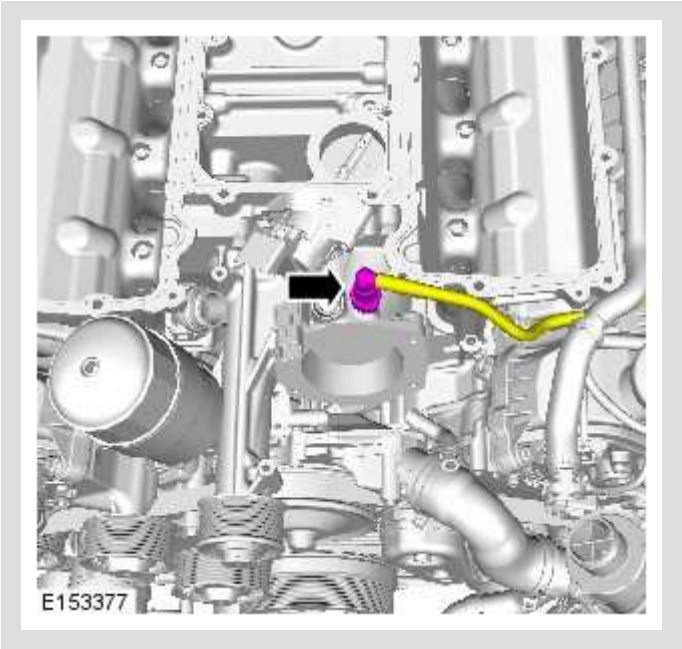
4. Refer to: Throttle Body (303-04B Fuel Charging and Controls - V8 S/C 5.0L Petrol, Removal and Installation).

5. Refer to: Supercharger Belt (303-05B Accessory Drive - V8 S /C 5.0L Petrol, Removal and Installation).

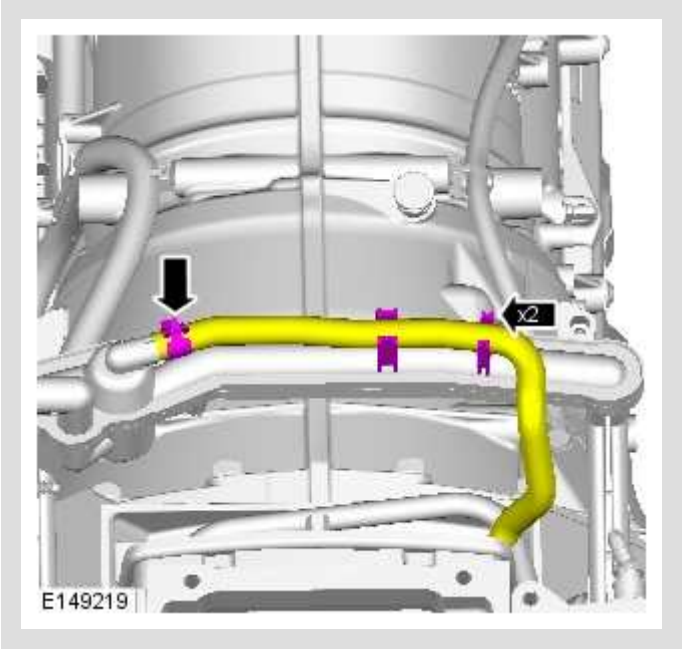
6. 

7.

cardiagn.com

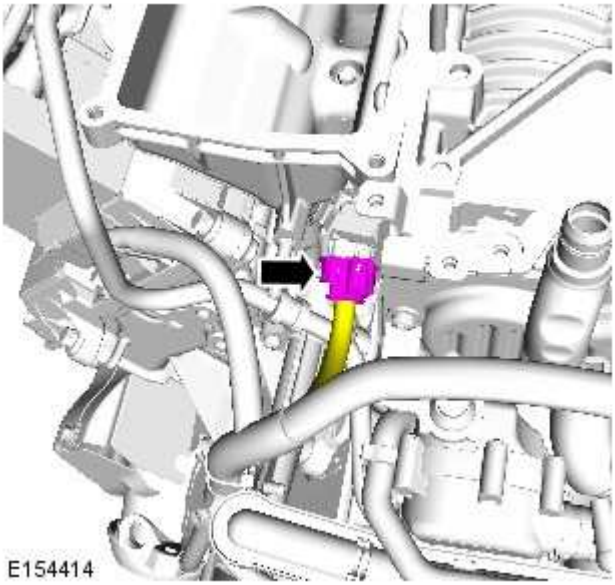


8.

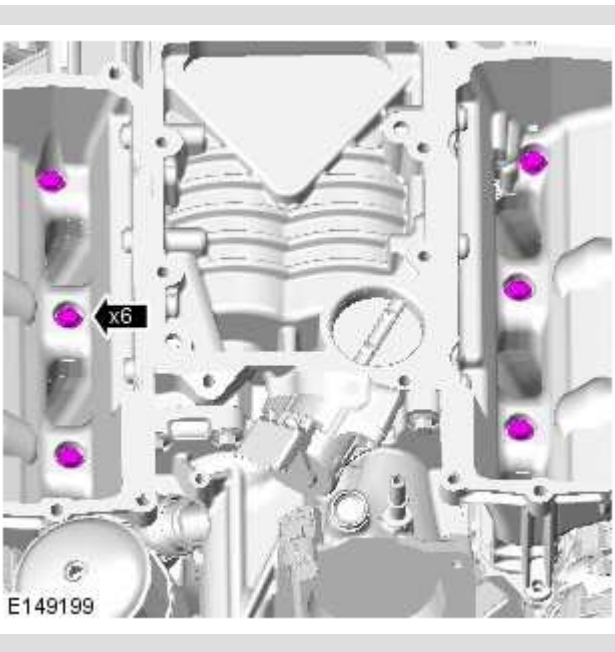


9.

cardiagn.com

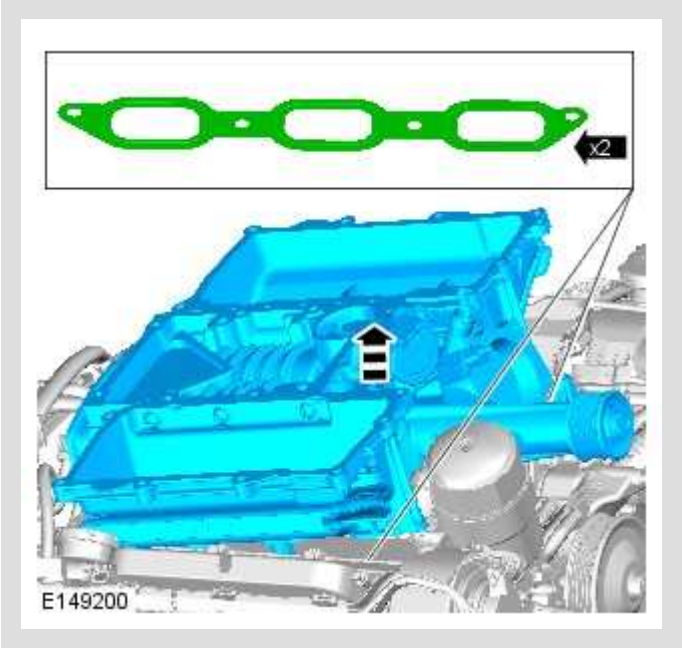


10.



11.

cardiagn.com

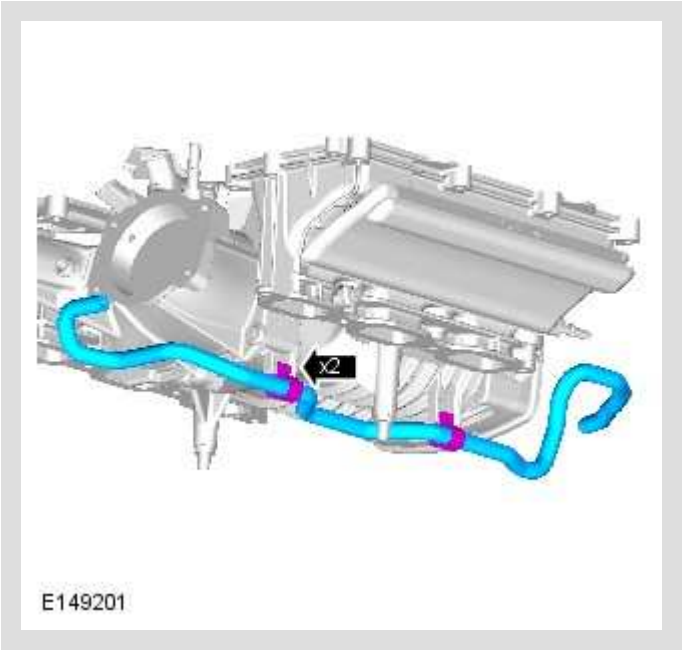


Discard the gaskets.

12.

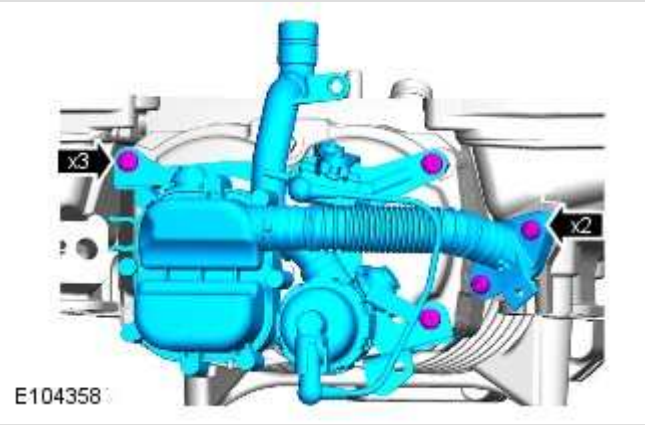
NOTE:

Do not disassemble further if the component is removed for access only.

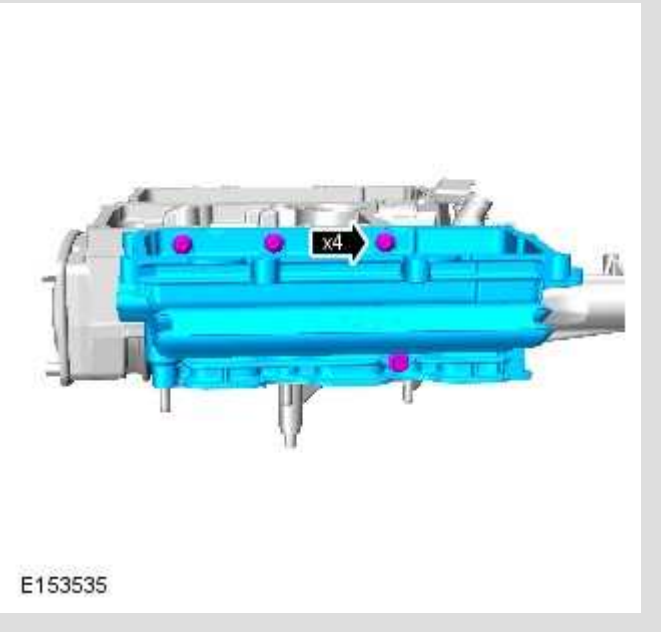


13.

cardiagn.com

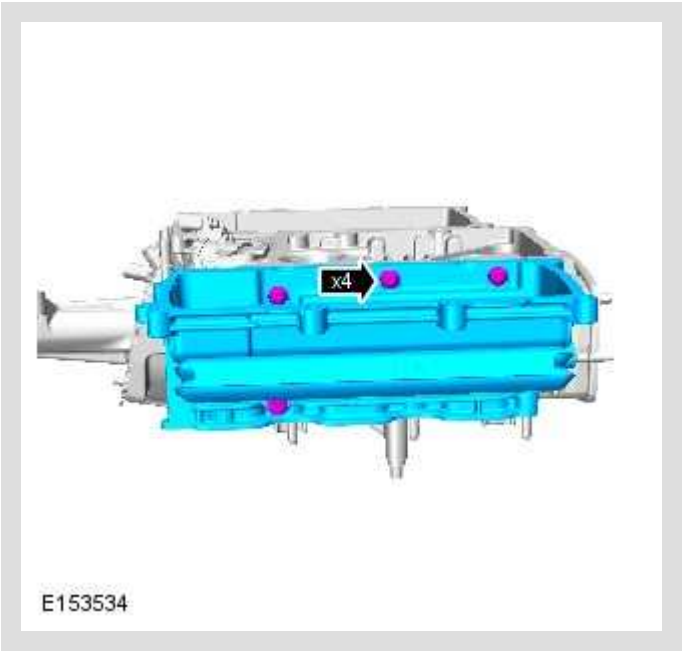


14.



15.

cardiagn.com



INSTALLATION

CAUTION:

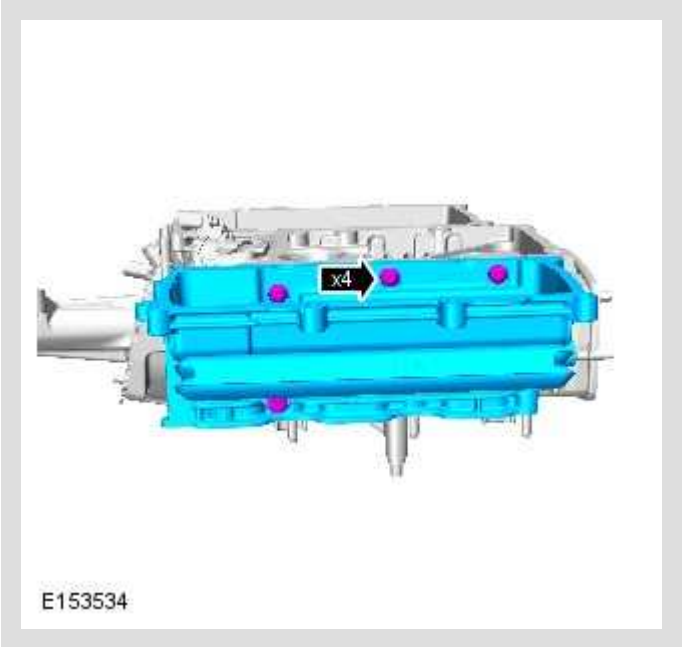
If a new cylinder head has been installed, then new taptite bolts must be used to install the supercharger.

NOTE:

cardiagn.com

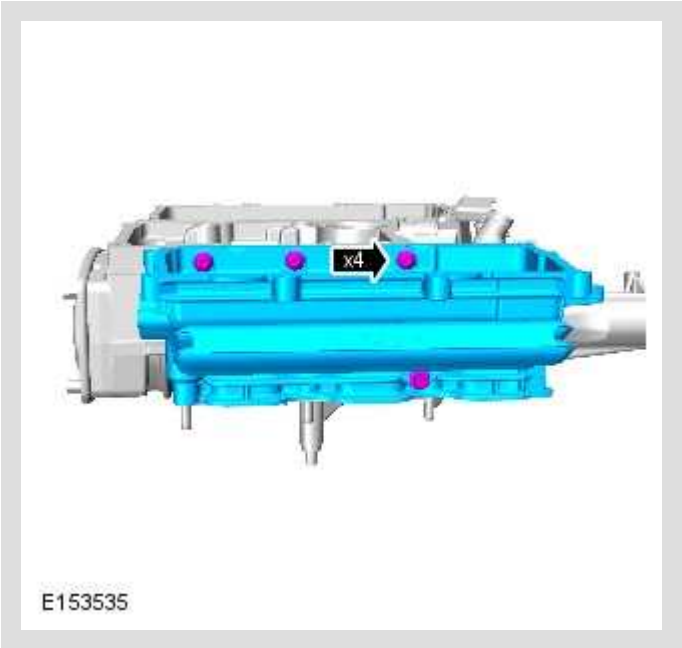
New taptite bolts when used cut their own threads on the first application.

1.



Torque: **25 Nm**

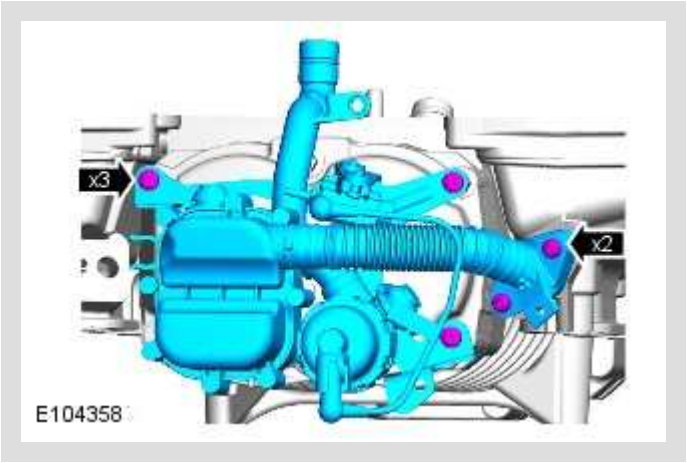
2.



Torque: **25 Nm**

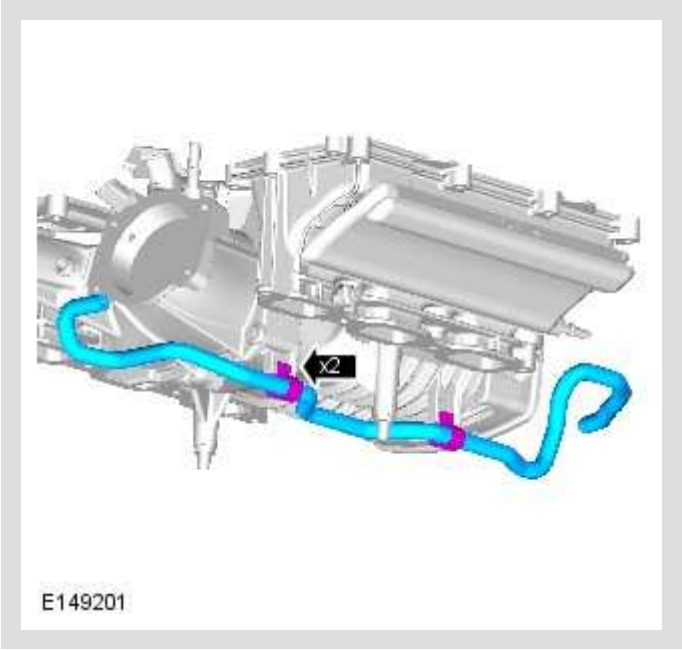
3.

cardiagn.com



Torque: **10 Nm**

4.



5.

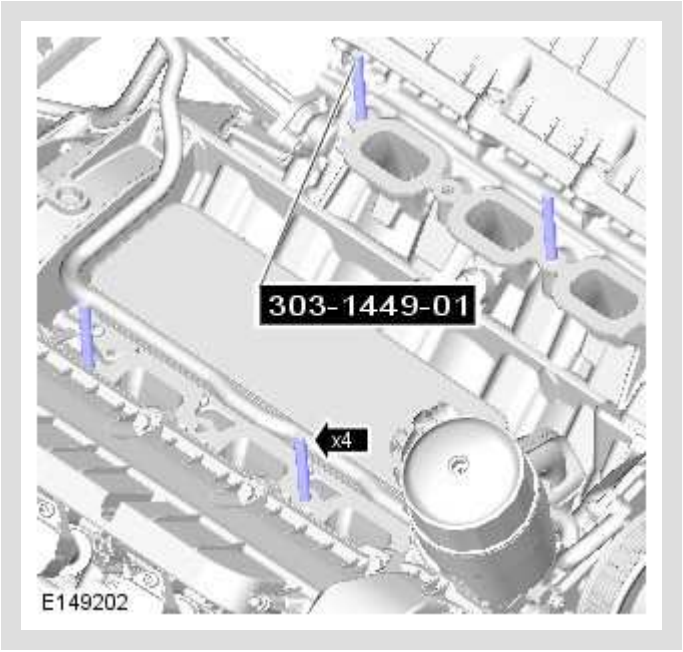
CAUTIONS:

- If a new cylinder head has been installed then the special tool 303-1449-02 without the thread must be used to install the supercharger.
- If a new cylinder head has been installed, then new taptite bolts must be used to install the supercharger.

cardiagn.com

NOTE:

New taptite bolts when used cut their own threads on the first application.



Special Tool(s): 303-1449-01 , 303-1449-02

6.

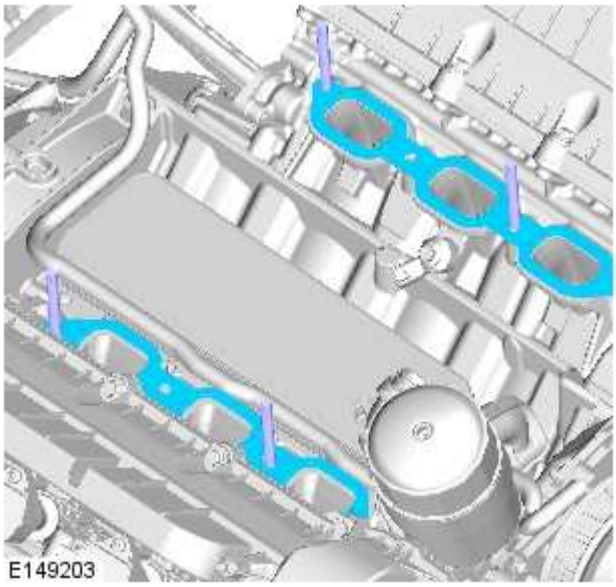
CAUTION:

Make sure that the mating faces are clean and free of foreign material.

NOTE:

Install new gaskets.

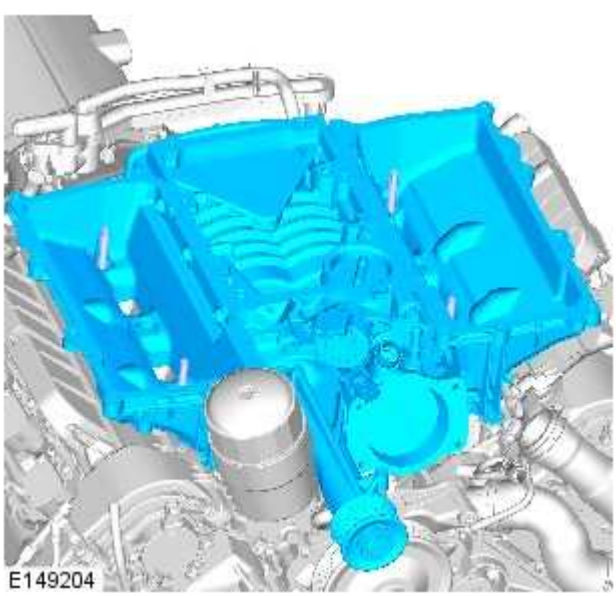
cardiagn.com



7.

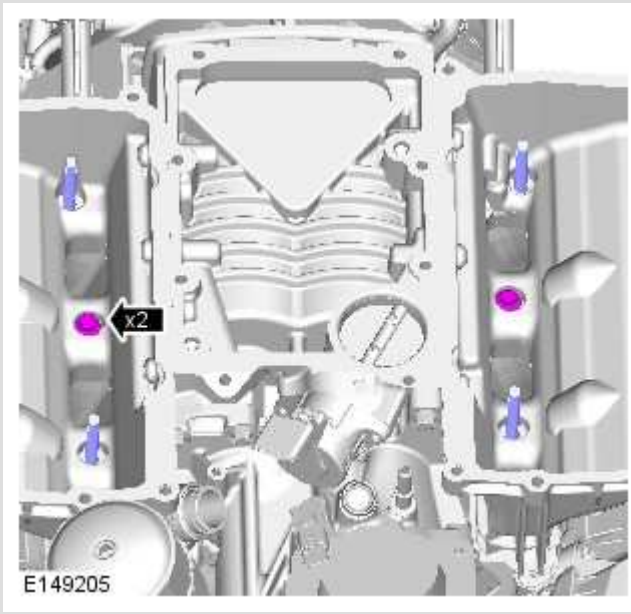
CAUTION:

Make sure that the mating faces are clean and free of foreign material.



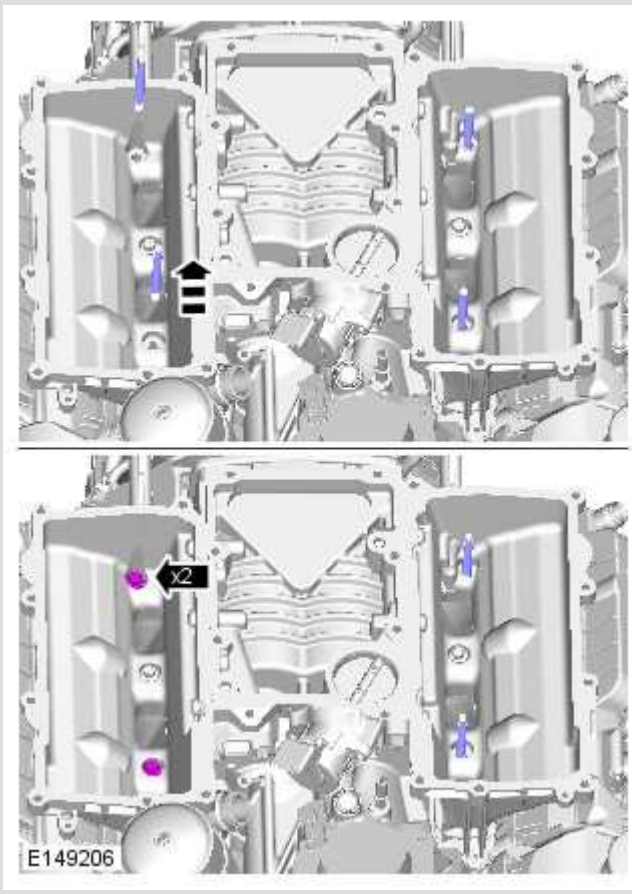
cardiagn.com

8.



Torque: **25 Nm**

9.

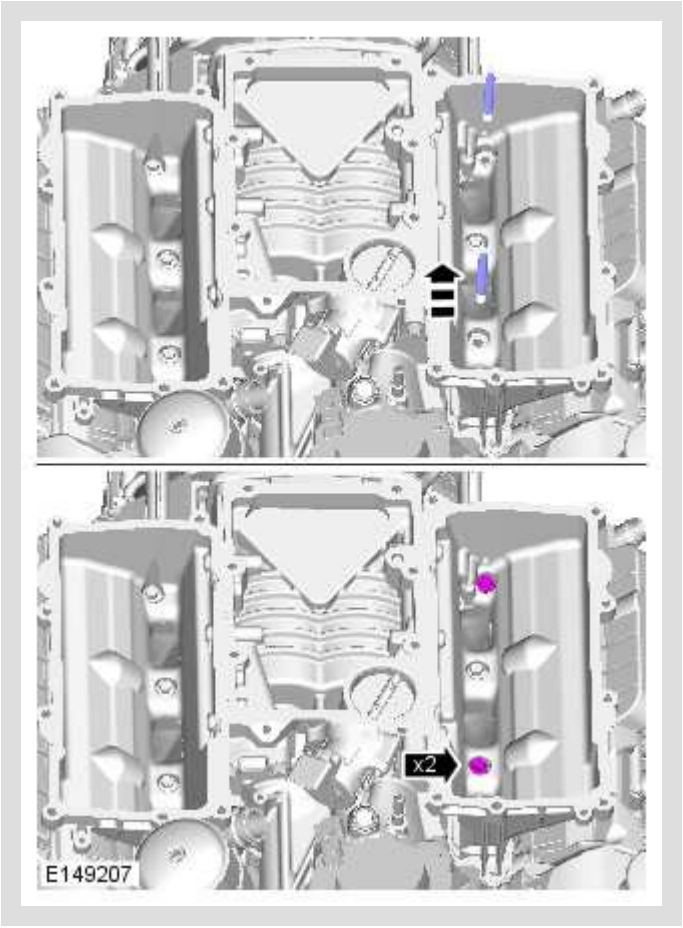


Special Tool(s): 303-1449-01 , 303-1449-02

Torque: **25 Nm**

10.

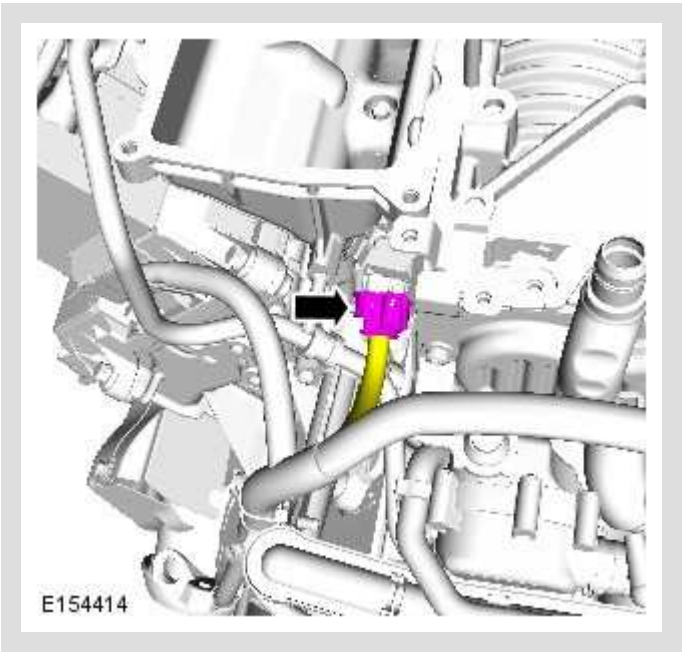
cardiagn.com



Special Tool(s): 303-1449-01 , 303-1449-02

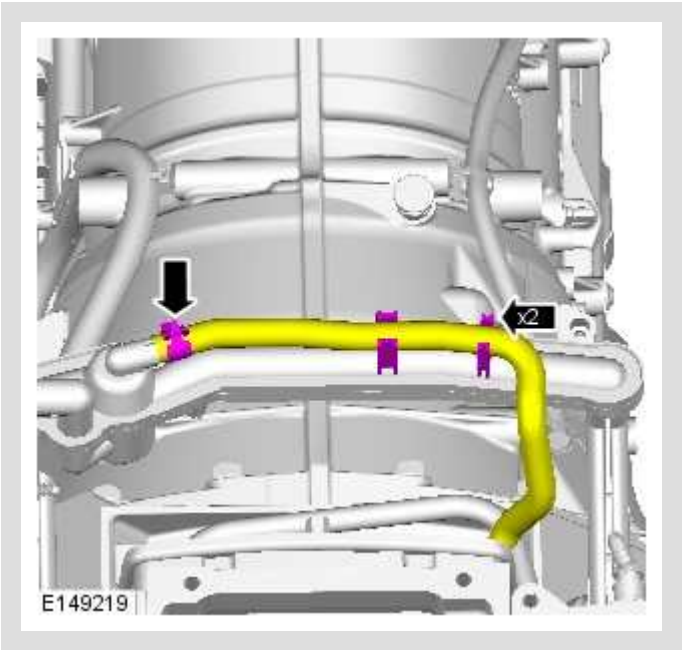
Torque: **25 Nm**

11.

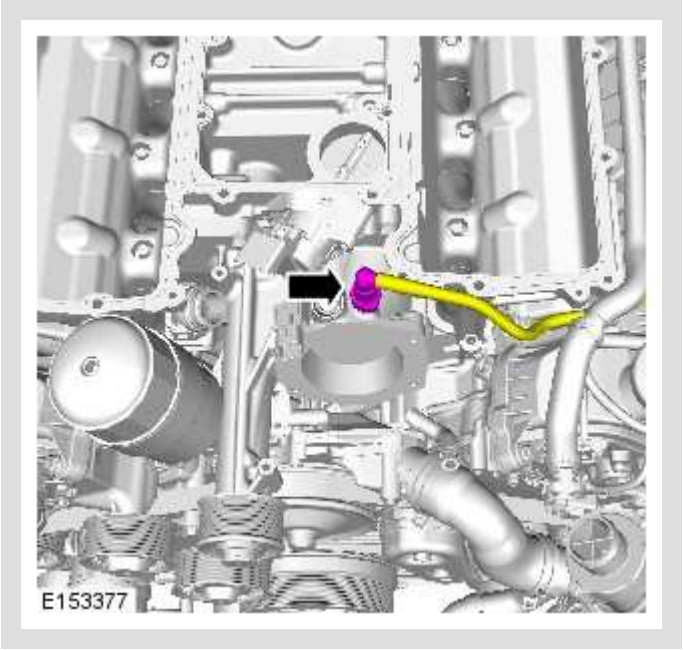


12.

cardiagn.com

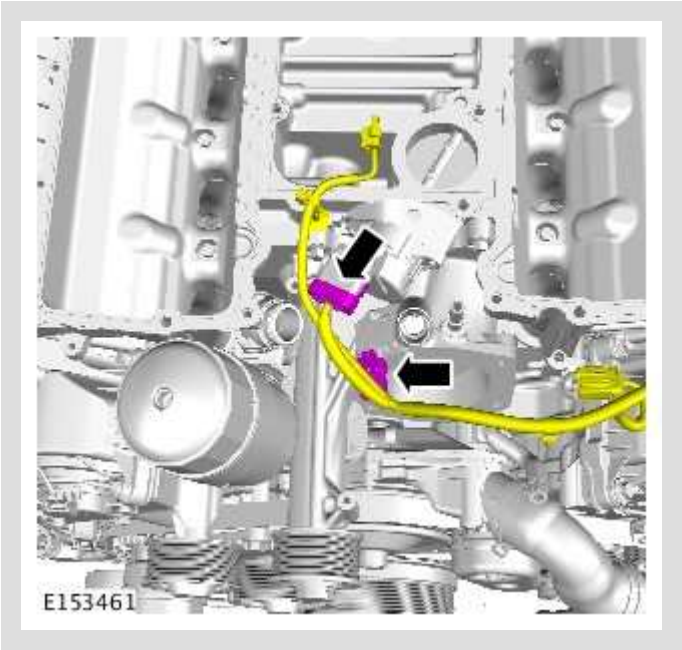


13.



14.

cardiagn.com



15. Refer to: Supercharger Belt (303-05B Accessory Drive - V8 S /C 5.0L Petrol, Removal and Installation).

16. Refer to: Throttle Body (303-04B Fuel Charging and Controls - V8 S/C 5.0L Petrol, Removal and Installation).

17. Refer to: Charge Air Cooler (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

18. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2015.0 F-TYPE (X152), 303-03

ENGINE COOLING - V8 S/C 5.0L PETROL

COOLING SYSTEM PARTIAL DRAINING AND VACUUM FILLING (G1816921)

GENERAL PROCEDURES

26.10.03	COOLANT - PARTIAL DRAIN AND VACUUM REFILL	ALL DERIVATIVES	0.4	USED WITHINS	

SPECIAL TOOL(S)

HU-919

Coolant System Vacuum Refill Kit

DRAINING

cardiagn.com

WARNING:

Since injury such as scalding could be caused by escaping steam or coolant, do not remove the filler cap from the coolant expansion tank while the system is hot.

CAUTIONS:

- The engine cooling system must be maintained with the correct concentration and type of anti-freeze solution to prevent corrosion and frost damage. Failure to follow this instruction may result in damage to the engine.
- Engine coolant will damage the paint finished surfaces. If spilt, immediately remove the coolant and clean the area with water.

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

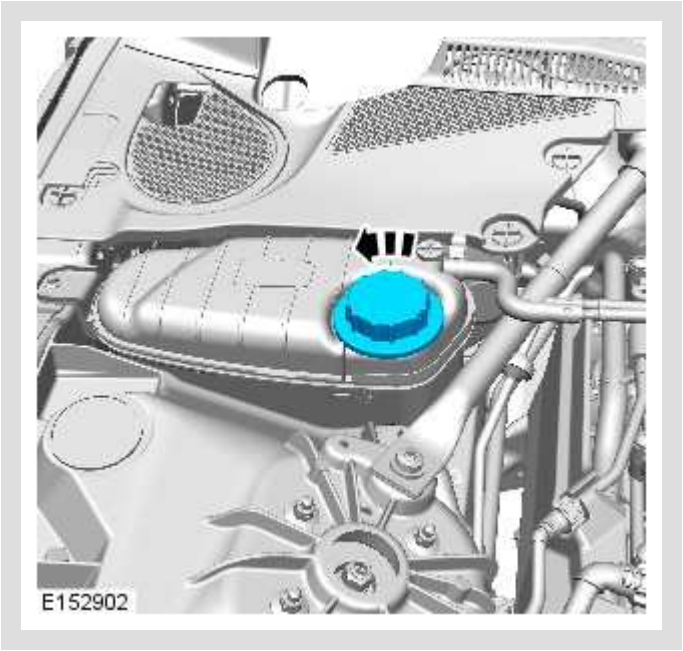
   Raise and support the vehicle.

2. **WARNINGS:**

   - Release the cooling system pressure by slowly turning the coolant expansion tank cap a quarter of a turn. Cover the expansion tank cap with a thick cloth to prevent the possibility of scalding. Failure to follow this instruction may result in personal injury.
   - Be prepared to collect escaping fluid.

cardiagn.com

- Since injury such as scalding could be caused by escaping steam or coolant, make sure the vehicle cooling system is cool prior to carrying out this procedure.



3.

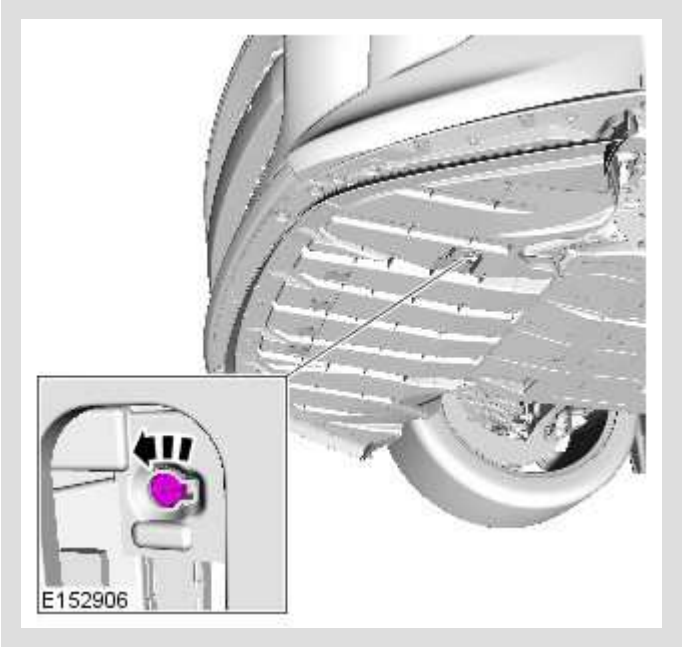
CAUTION:

Be prepared to collect escaping fluids.

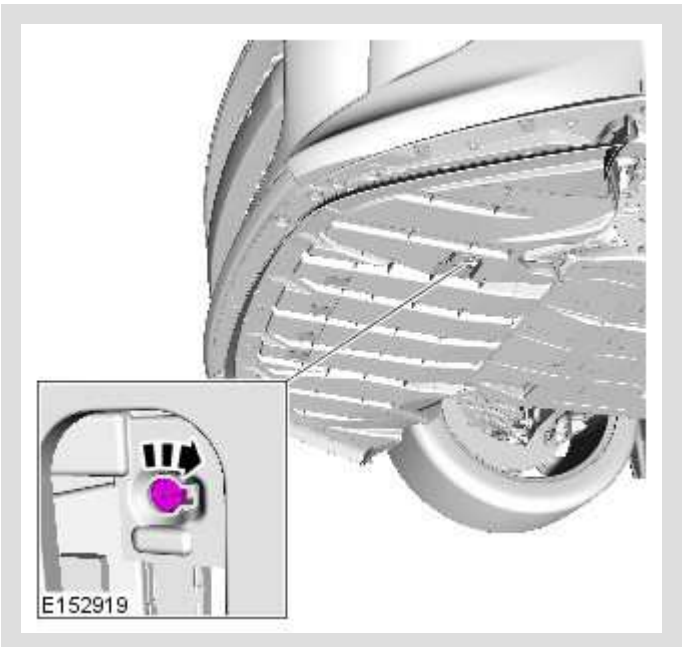
NOTE:

Collect the coolant in a clean container and reuse.

cardiagn.com



4.



Torque: **2 Nm**

cardiagn.com

FILLING

WARNING:

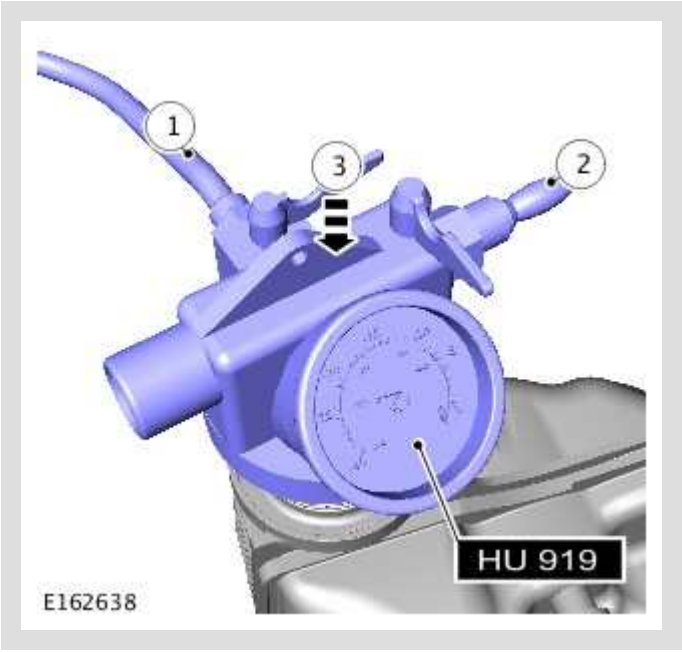
Since injury such as scalding could be caused by escaping steam or coolant, do not remove the filler cap from the coolant expansion tank while the system is hot.

CAUTIONS:

- The engine cooling system must be maintained with the correct concentration and type of anti-freeze solution to prevent corrosion and frost damage. Failure to follow this instruction may result in damage to the engine.
- Engine coolant will damage the paint finished surfaces. If spilt, immediately remove the coolant and clean the area with water.

1. Prepare a sufficient amount of coolant to the specified concentration.

2.



cardiagn.com

NOTES:

Make sure the coolant supply valve is in the closed position on the special tool.

The special tool needs an air pressure of 6 to 8 bar (87 to 116 psi) to operate correctly.

Small diameter or long airlines may restrict airflow to the coolant vacuum fill tool.

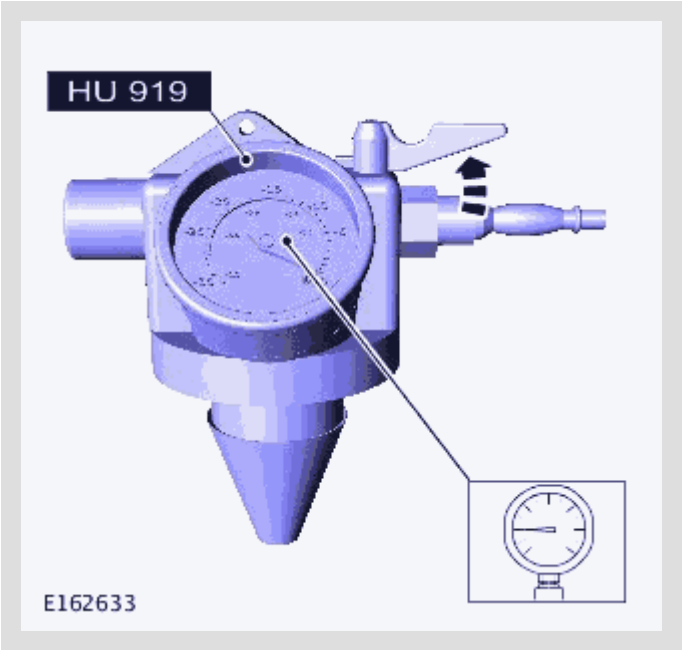
1. Position the hose from the special tool into a container of clean coolant.
1. Connect a regulated compressed air supply to the special tool.
1. Move the special tool to the expansion tank.
   Special Tool(s): HU-919

3.

NOTES:

- Make sure the coolant supply valve is in the closed position on the special tool.
- The special tool needs an air pressure of 6 to 8 bar (87 to 116 psi) to operate correctly.
- Small diameter or long airlines may restrict airflow to the coolant vacuum fill tool.

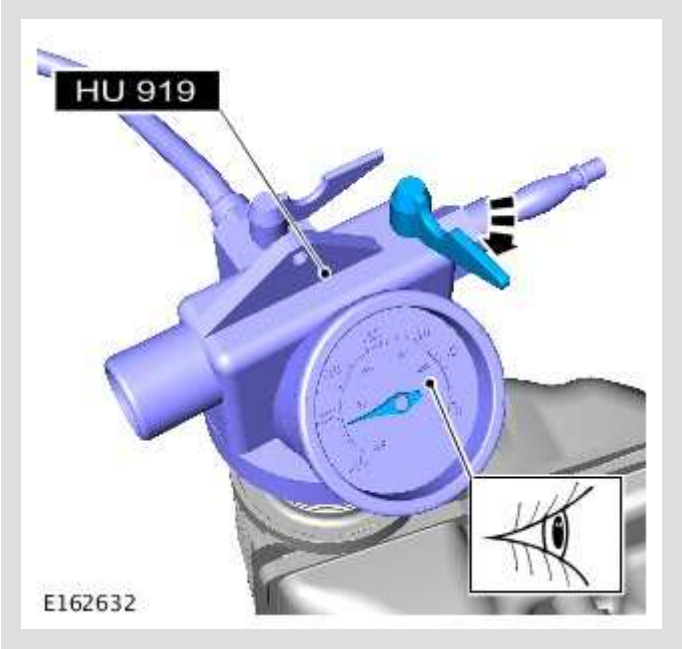
cardiagn.com



Open the air supply valve until -0.8 (-12 psi) Bar is shown on the gauge.

Special Tool(s): HU-919

4.



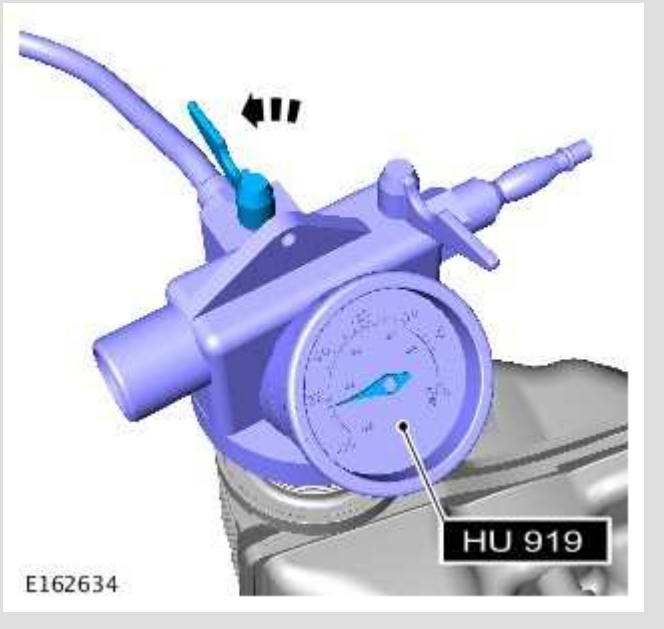
Close the air supply valve.

cardiagn.com

Allow 1 minute to check the vacuum is held.
Special Tool(s): HU-919

5. **NOTES:**

- The coolant is to be reused.
- Close the coolant supply valve when the coolant expansion tank MAX mark is reached or coolant movement has stopped.



Open the coolant supply valve and allow the coolant to be drawn into the system.
Special Tool(s): HU-919

6. Remove the special tool.

7. Connect exhaust extraction hoses to the tail pipes.

8. Start and run the engine.

9. **CAUTION:**

cardiagn.com

Correct installation of the coolant expansion tank cap can be obtained by tightening the cap until 3 audible clicks are heard.

Install the coolant expansion tank cap.

10. Hold the engine speed at 2000 revolutions per minute (RPM) until warm air is expelled from the heater.

11. Switch the engine off and allow to cool.

12. Clean any spilt or excess coolant from the vehicle.

13. **WARNING:**

Since injury such as scalding could be caused by escaping steam or coolant, allow the vehicle cooling system to cool prior to carrying out this procedure.

Check and top-up the coolant if required.

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

BATTERY

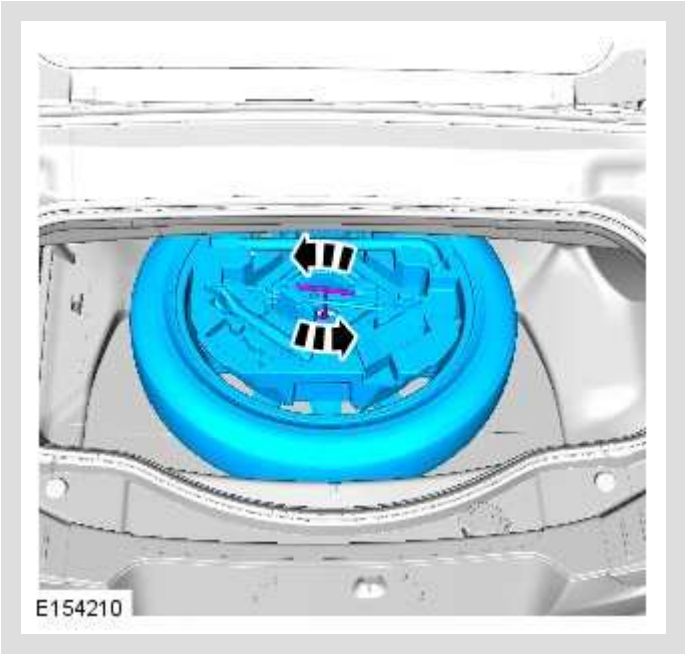
86.15.15	DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

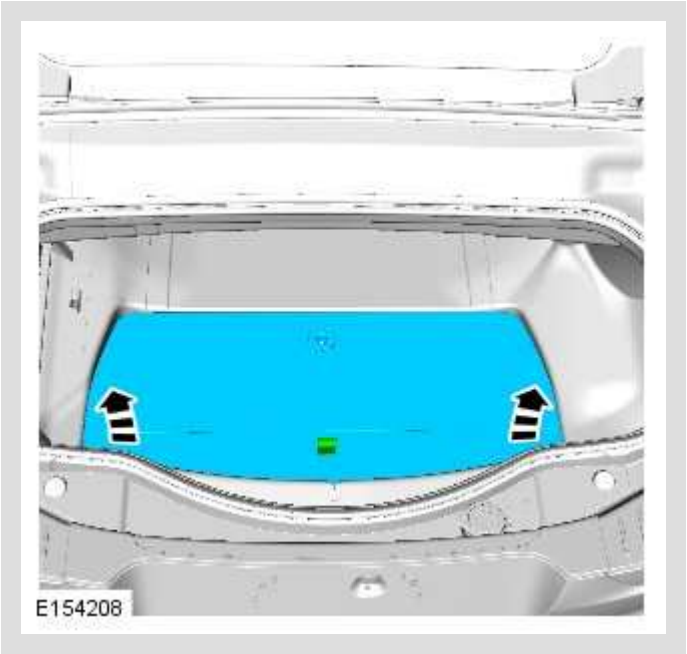
1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

2. Obtain and record the audio unit preset radio frequencies.

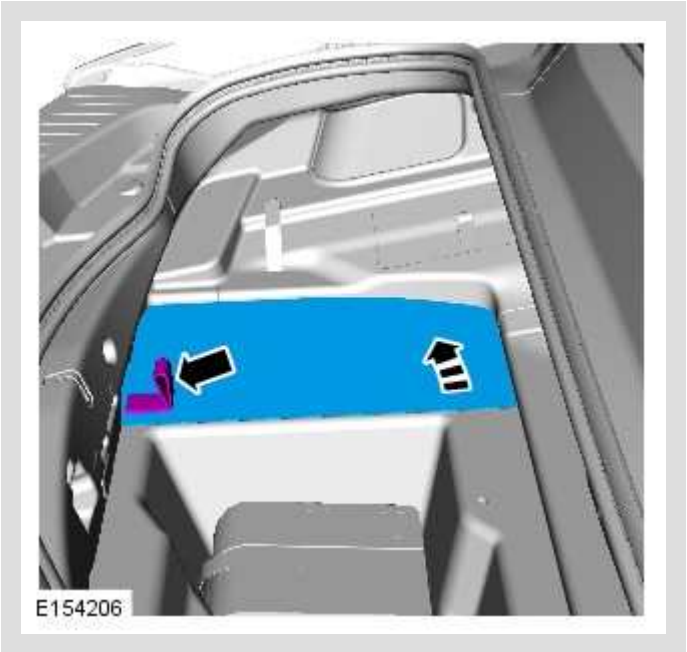
3. 

4.

cardiagn.com



5.

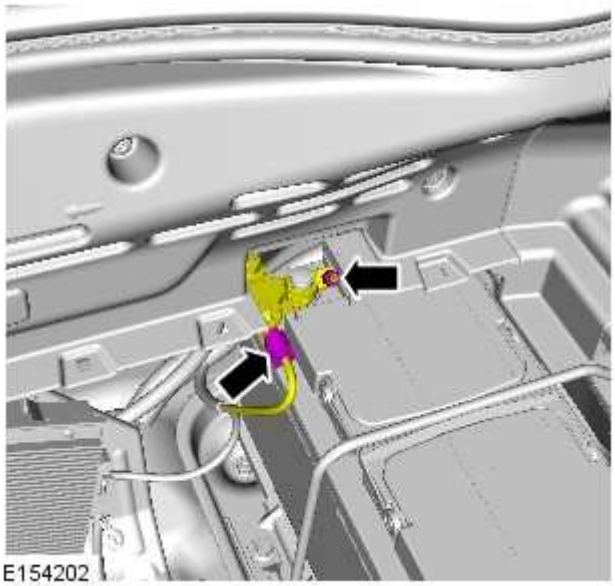


6.

CAUTION:

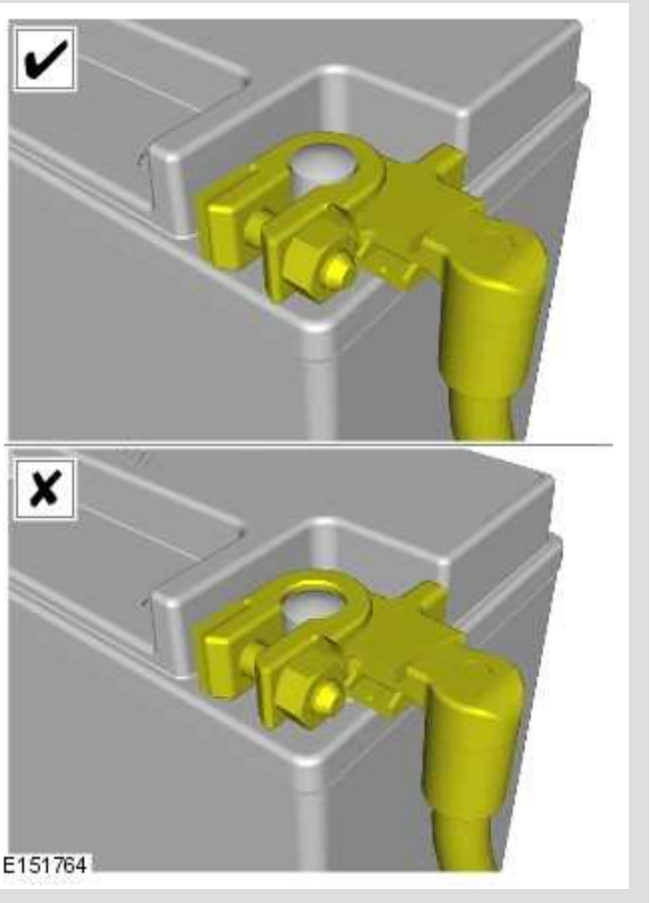
Take extra care not to damage the wiring harnesses.

cardiagn.com



Torque: **6 Nm**

7.



8. To install, reverse the removal procedure.

cardiagn.com

9. **NOTE:**

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

OIL FILTER ELEMENT (G1584113)

REMOVAL AND INSTALLATION

12.60.02	OIL FILTER ELEMENT - RENEW	ALL DERIVATIVES	0.1	USED WITHINS

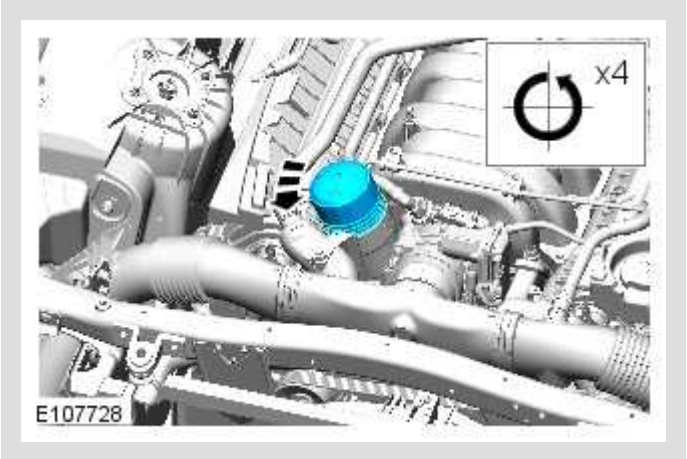
REMOVAL

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

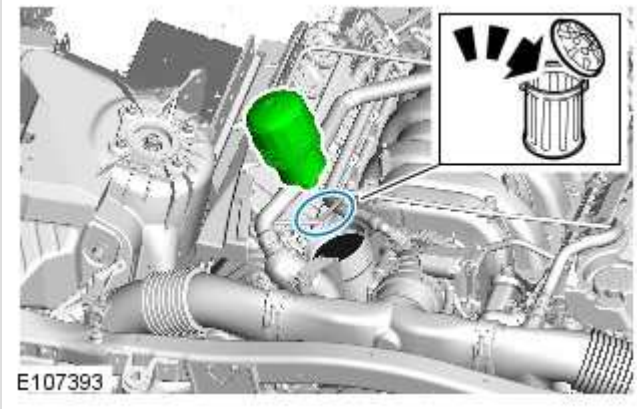
2.



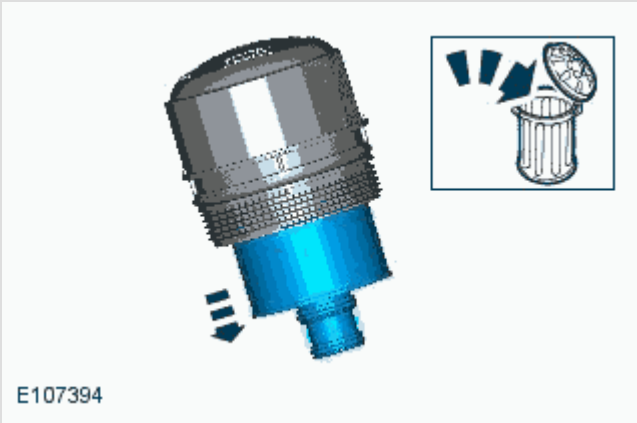
cardiagn.com

Allow the engine oil to drain from the oil filter element housing for two minutes.

3.

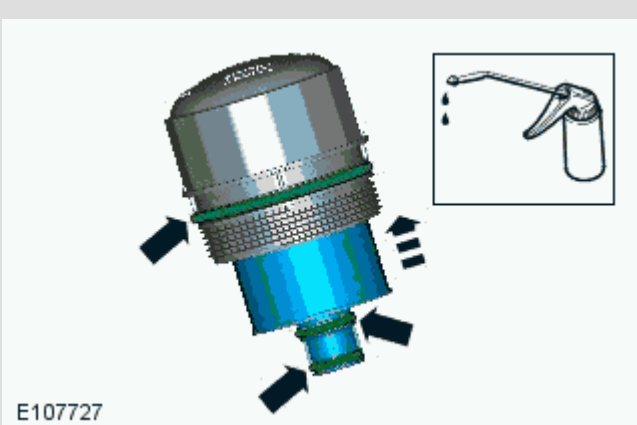


4.



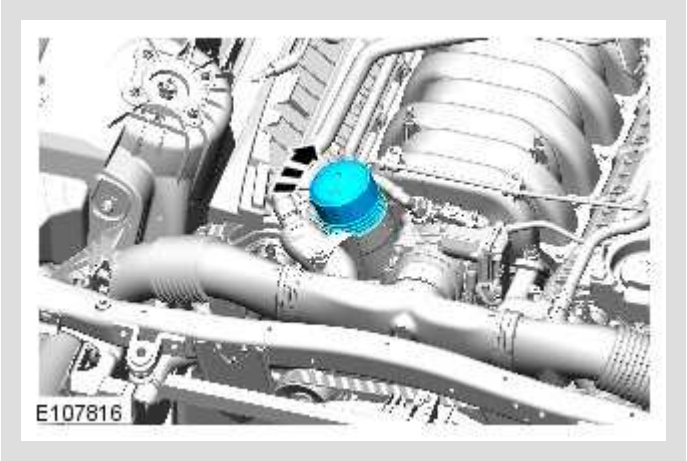
INSTALLATION

1.



2.

cardiagn.com



Torque: **25 Nm**

3. Check and top-up the engine oil.

4. Start and run the engine.

5. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

cardiagn.com

2015.0 F-TYPE (X152), 501-05

INTERIOR TRIM AND ORNAMENTATION

ENGINE COVER (G1580231)

REMOVAL AND INSTALLATION

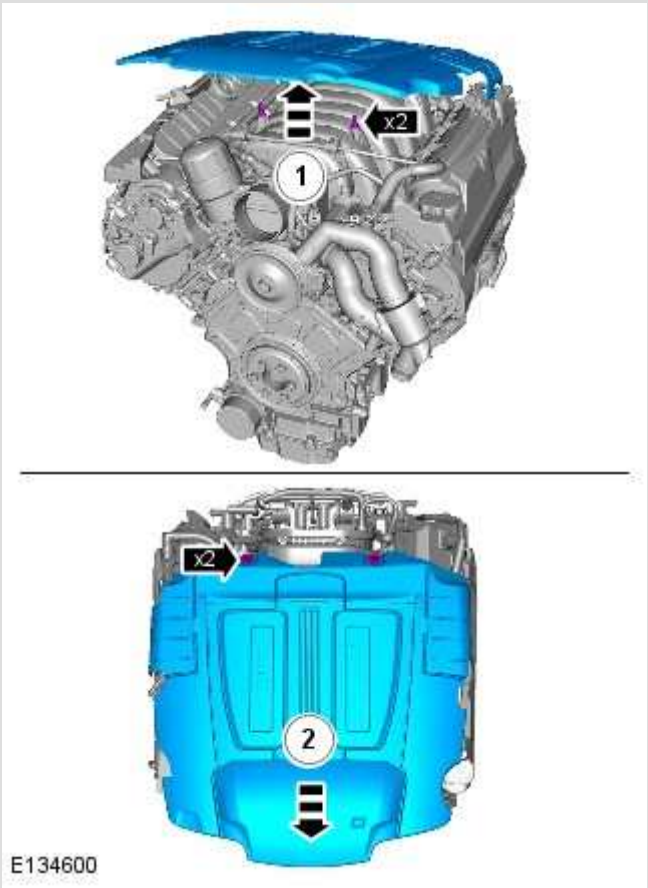
12.29.93	ENGINE COVER - RENEW	ALL DERIVATIVES	0.1	USED WITHINS	

REMOVAL

1.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.



INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

OIL PAN EXTENSION (G1774731)

REMOVAL AND INSTALLATION

12.60.48	OIL PAN BODY ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	13	USED WITHINS	

SPECIAL TOOL(S)

303-1433

Lower Timing Cover Alignment tool

303-1437

Crankshaft Damper Remover/Installer

cardiagn.com

303-1438

Crankshaft Damper Bolt Remover/Installer

303-1439

Crankshaft Damper Removal Plate

303-1440

Crankshaft Damper Removal/Installation Stud

303-1441

Crankshaft Damper Remover/Installer Body

cardiagn.com

E152576	**JLR-303-1304** Locking Tool

REMOVAL

All vehicles

WARNING:

This procedure involves fuel handling. Be prepared for fuel spillage at all times and always observe fuel handling precautions. Failure to follow these instructions may result in personal injury.

NOTES:

- Some components shown removed for clarity.
- Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable

cardiagn.com

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

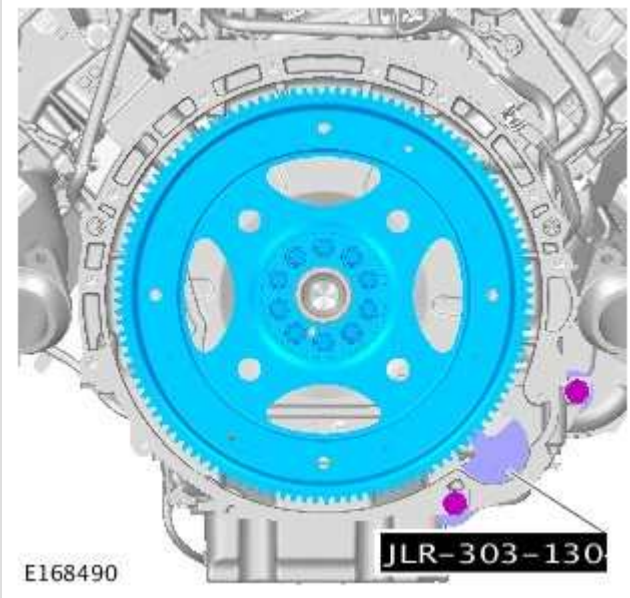
Raise and support the vehicle.

3. Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

4. Refer to: Engine (303-01A Engine - V6 S/C 3.0L Petrol, Removal).

Vehicles with automatic transmission

1.

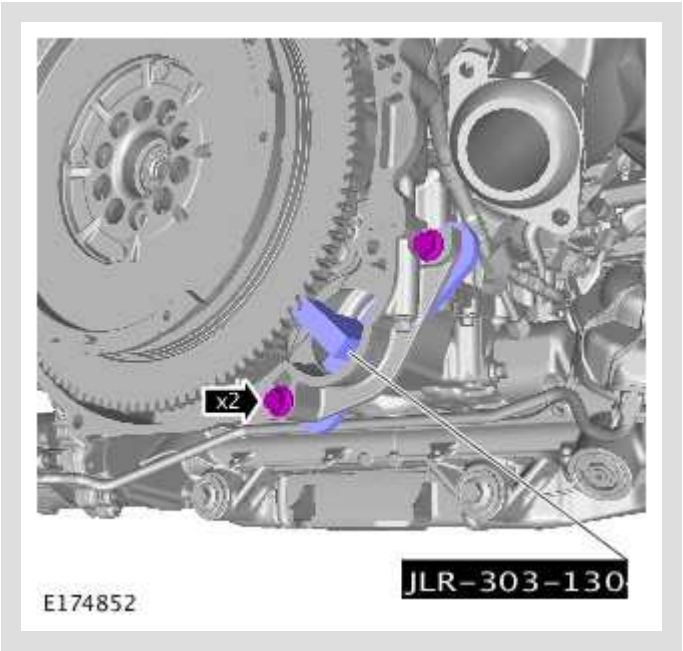


Install the special tool.
Special Tool(s): JLR-303-1304

Vehicles with manual transmission

cardiagn.com

1.

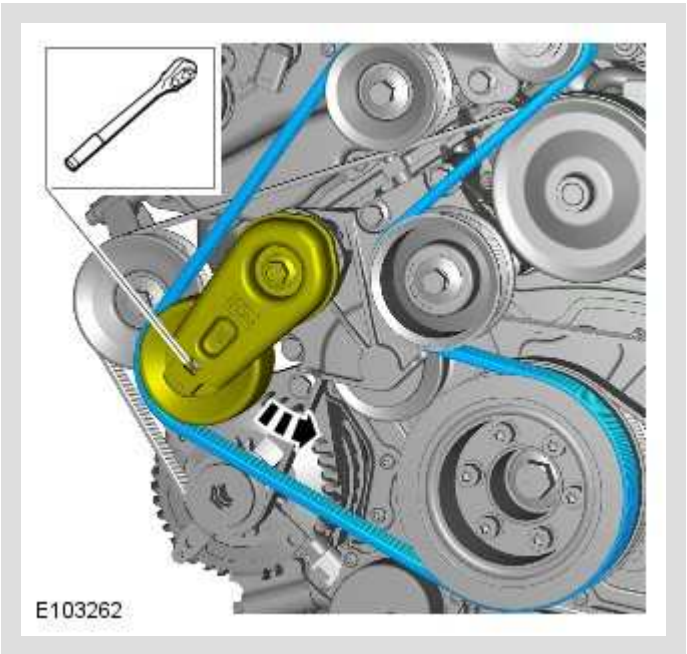


Install the special tool.

Special Tool(s): JLR-303-1304

All vehicles

1.

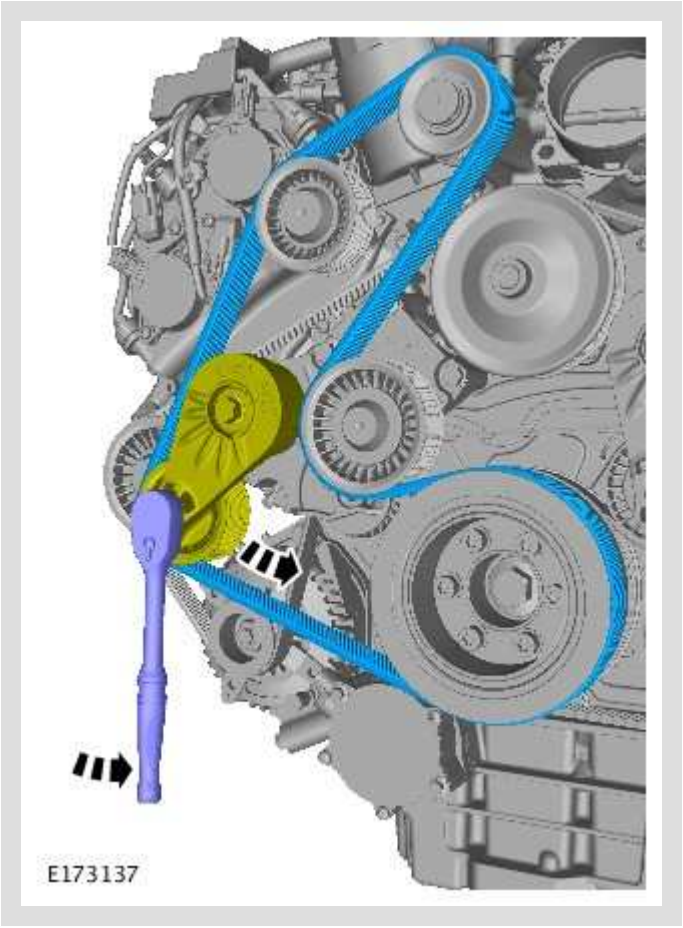


2.

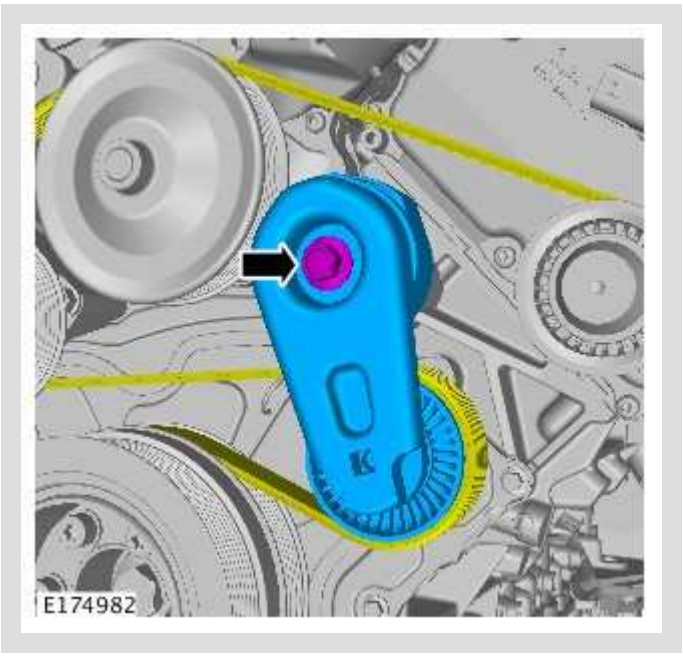
NOTE:

If equipped.

cardiagn.com



3.



4.

NOTE:

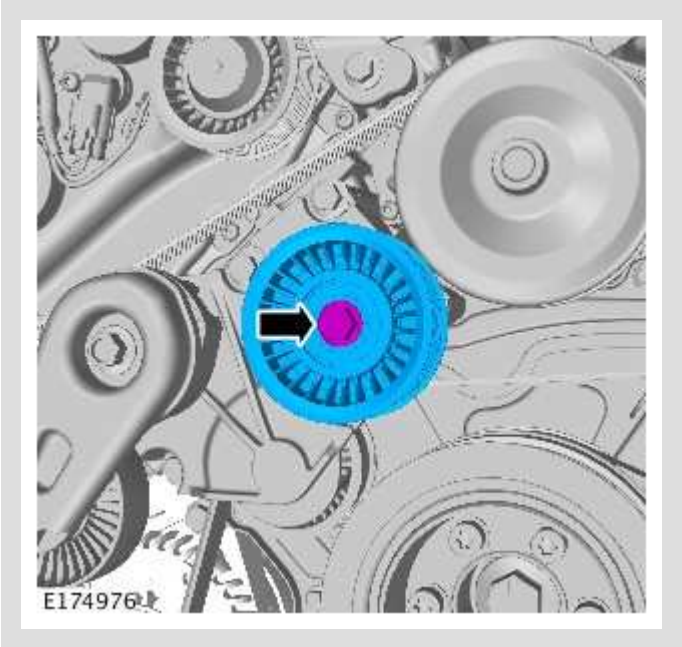
If equipped.

cardiagn.com

5.

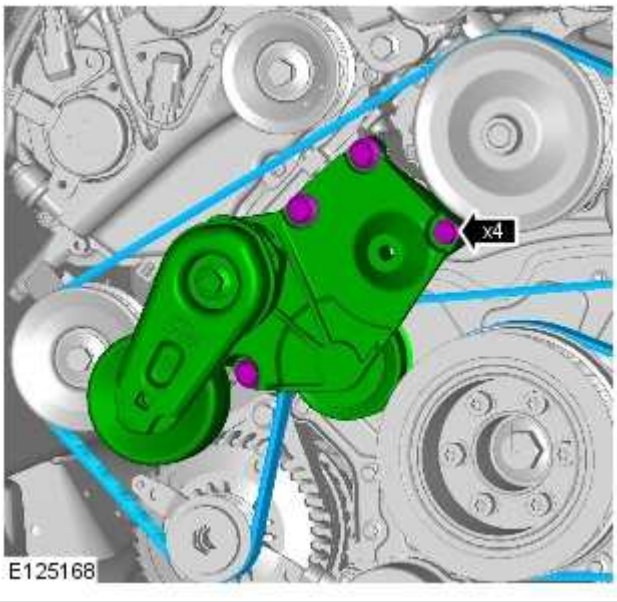
6.

cardiagn.com



7.

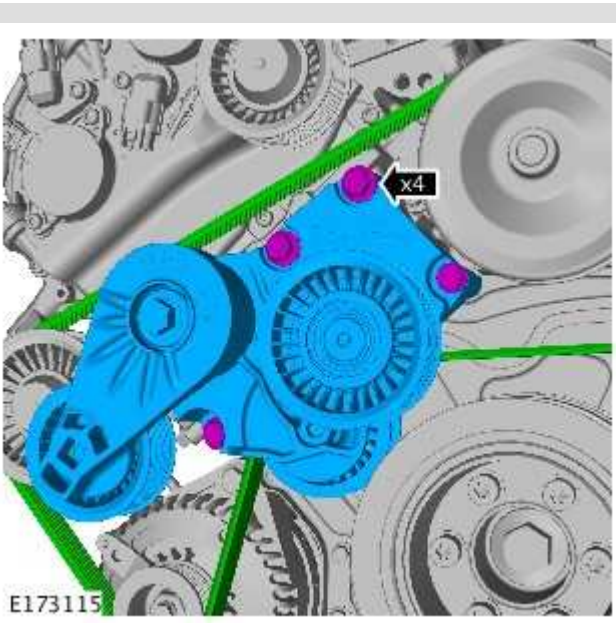
cardiagn.com



8.

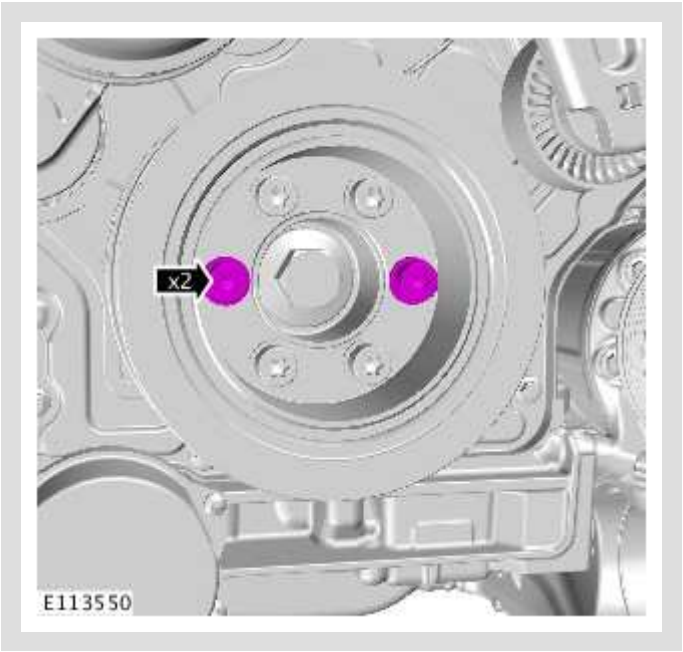
NOTE:

If equipped.

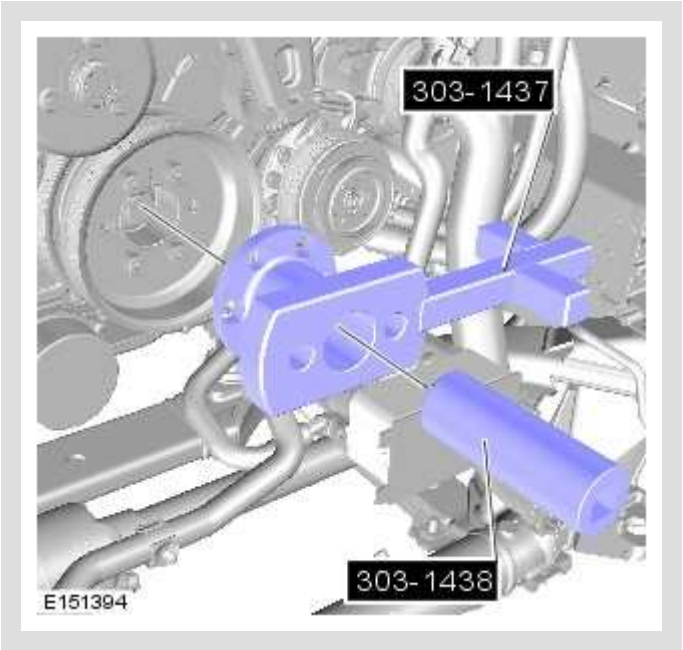


9.

cardiagn.com



10.

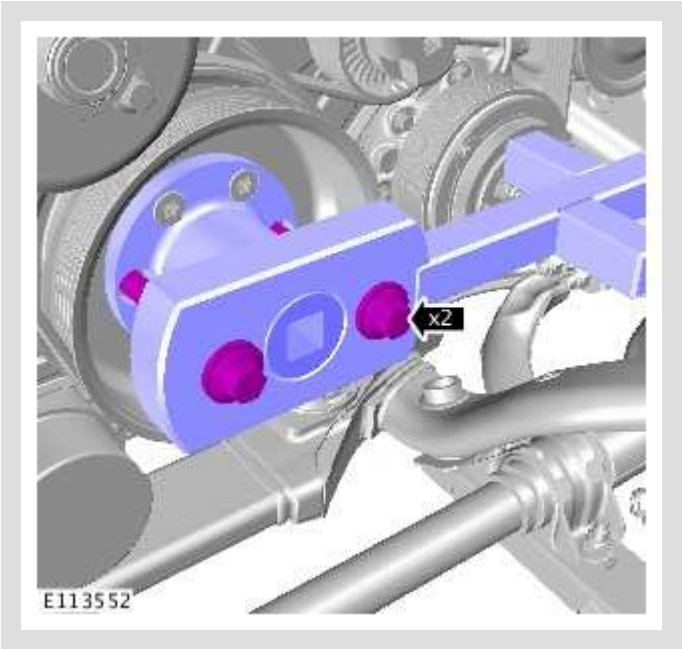


Install the special tool.

Special Tool(s): 303-1438 , 303-1437

11.

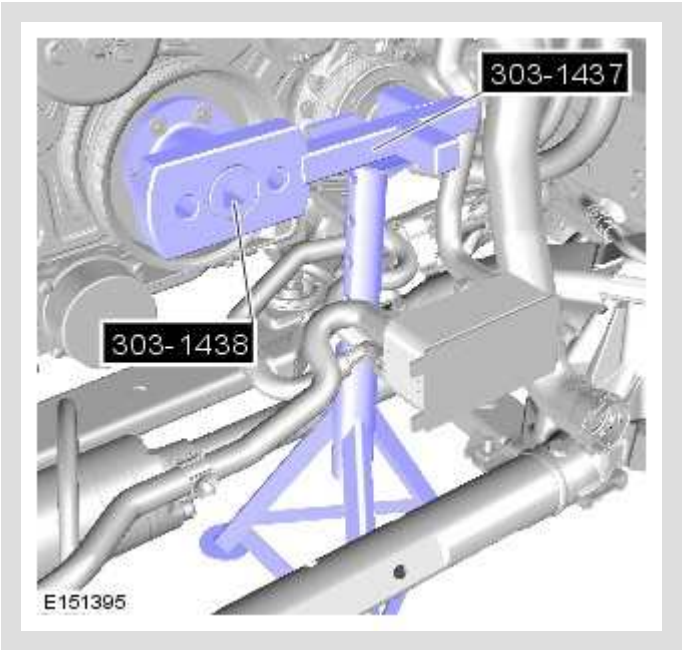
cardiagn.com



Special Tool(s): 303-1438 , 303-1437

Torque: **25 Nm**

12.



Support the special tool using a suitable vehicle stand.

Special Tool(s): 303-1438 , 303-1437

13.

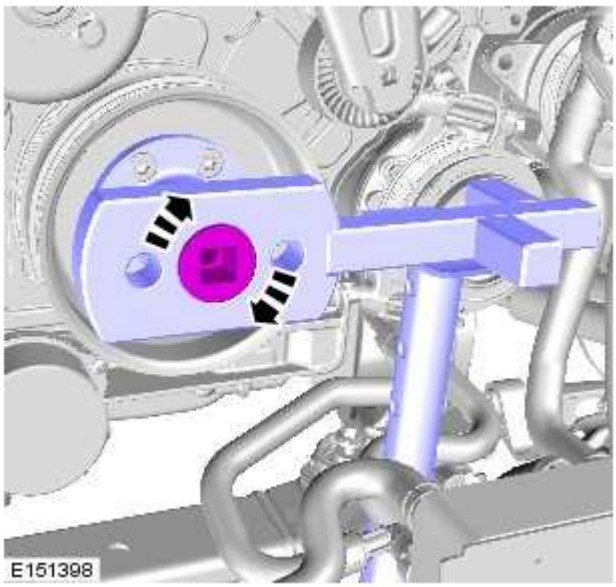
CAUTION:

cardiagn.com

The crankshaft pulley bolt must be removed clockwise. Failure to follow this instruction may result in damage to the crankshaft.

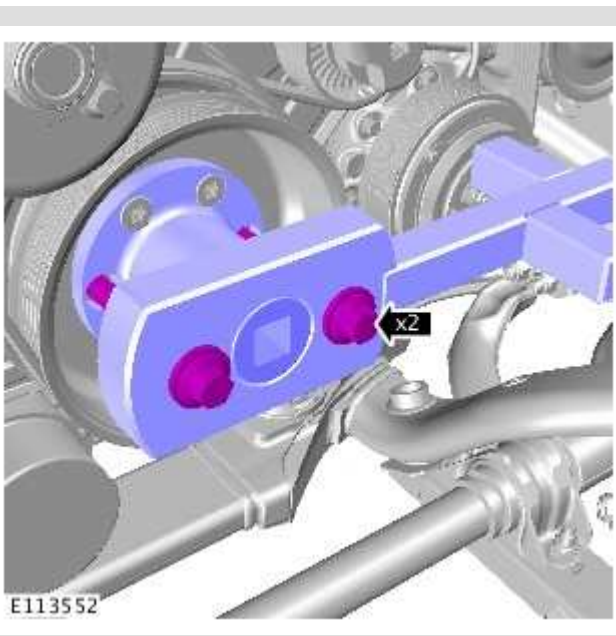
NOTE:

The crankshaft pulley bolt will be very tight.



Special Tool(s): 303-1438 , 303-1437

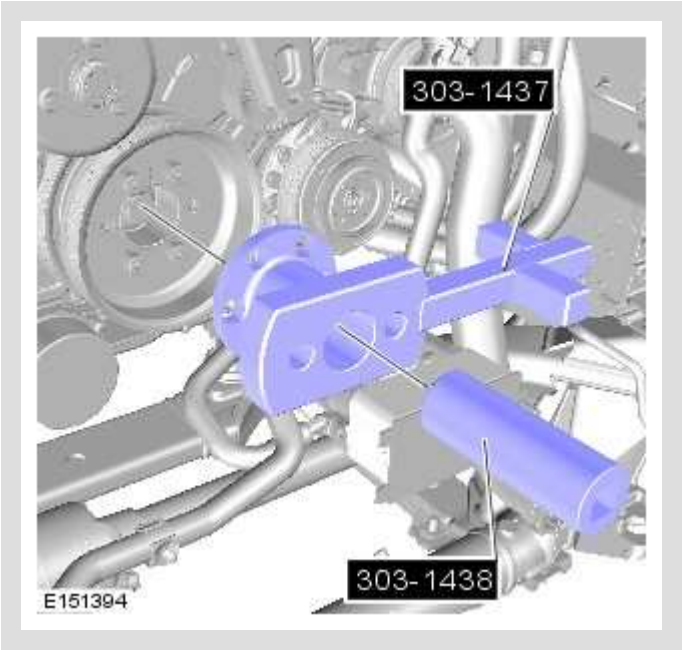
14.



cardiagn.com

Special Tool(s): 303-1438 , 303-1437

15.



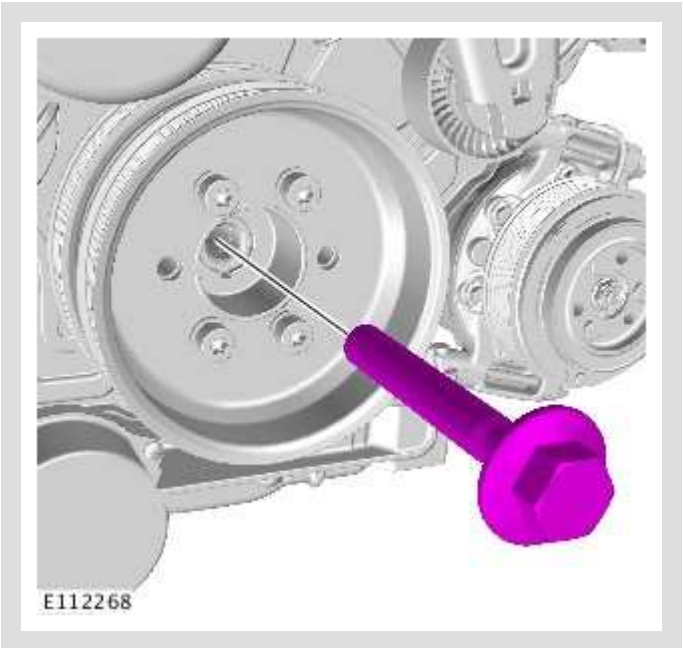
Remove the special tools.

Special Tool(s): 303-1438 , 303-1437

16.

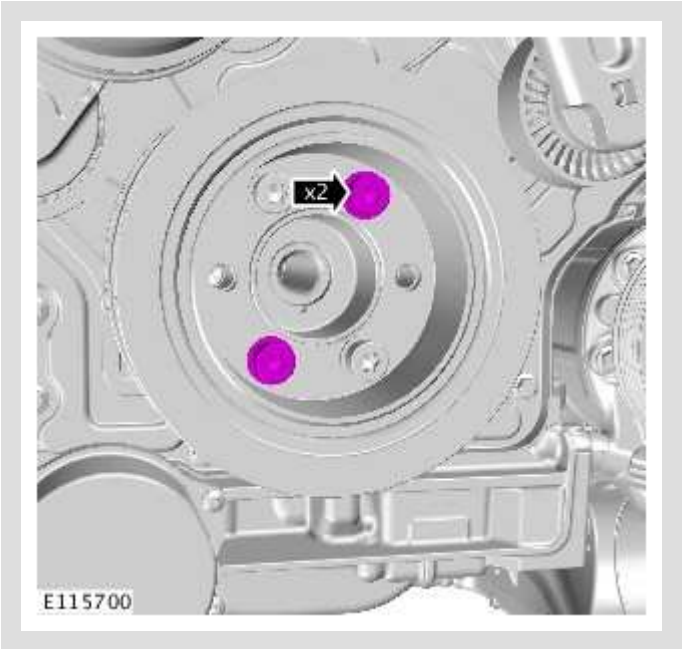
NOTE:

Discard the bolt after removal.

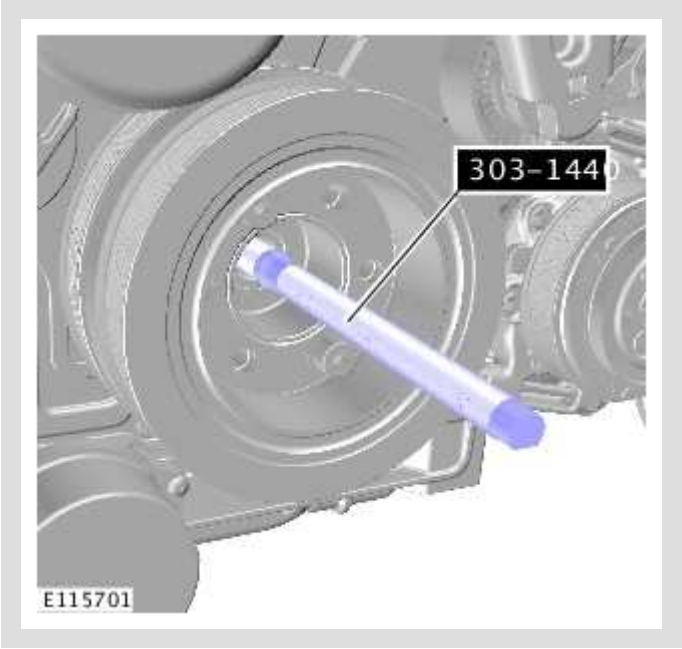


17.

cardiagn.com



18.

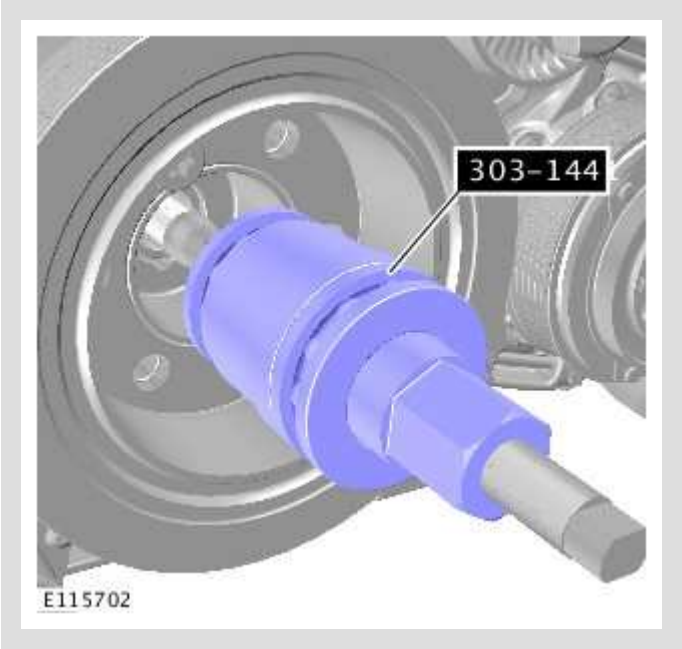


Install the special tool.

Special Tool(s): 303-1440

19.

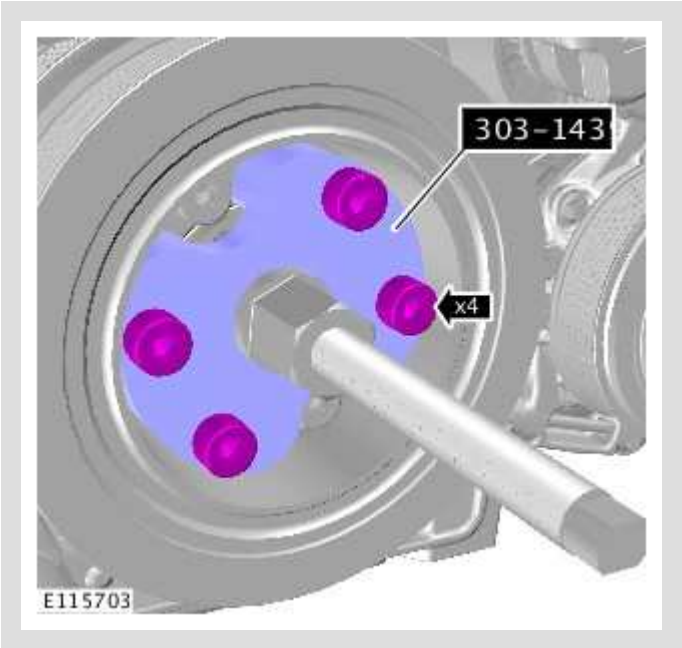
cardiagn.com



Install the special tool.

Special Tool(s): 303-1441

20.



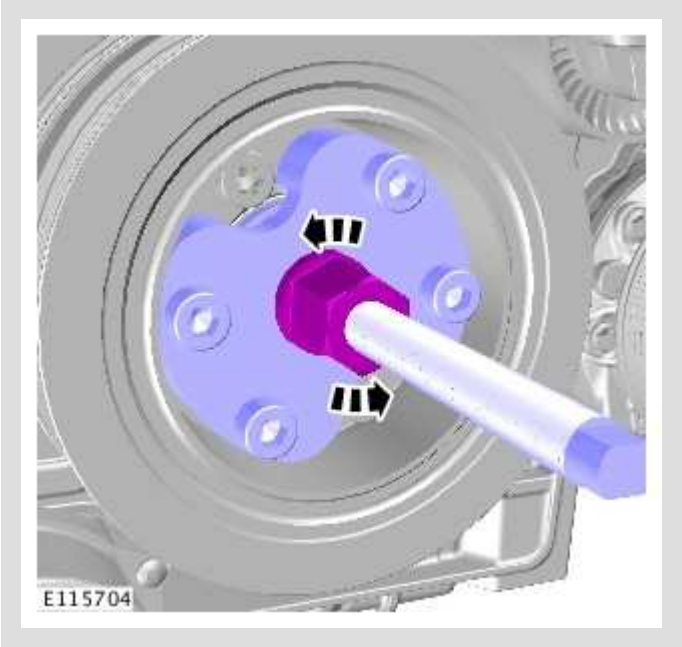
Install the special tool.

Special Tool(s): 303-1439

Torque: **25 Nm**

cardiagn.com

21.



Special Tool(s): 303-1439 , 303-1440

22.

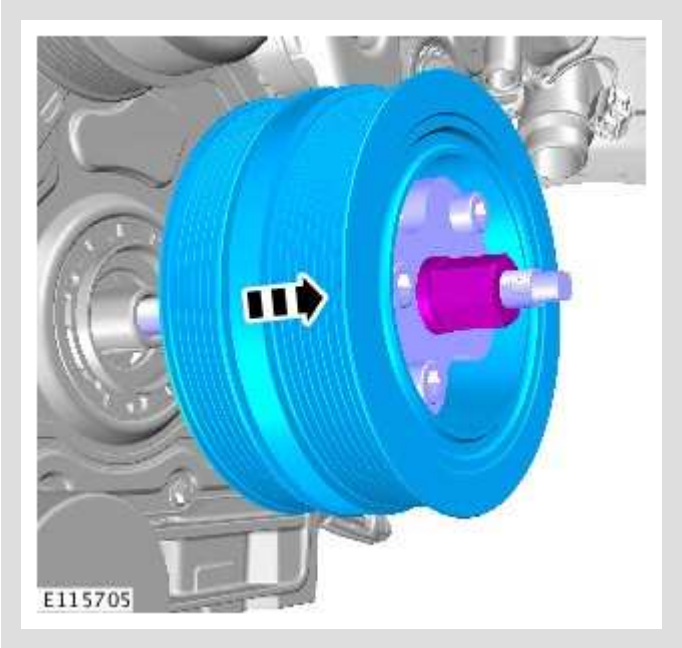
CAUTION:

Discard the friction washer after removing the crankshaft pulley.

NOTE:

Make sure to clean the threads in the end of the crankshaft and that the crank nose is free of any foreign materials.

cardiagn.com



23.

Special Tool(s): 303-1439

cardiagn.com

24.

Special Tool(s): 303-1440 , 303-1441

Vehicles with automatic transmission

1.

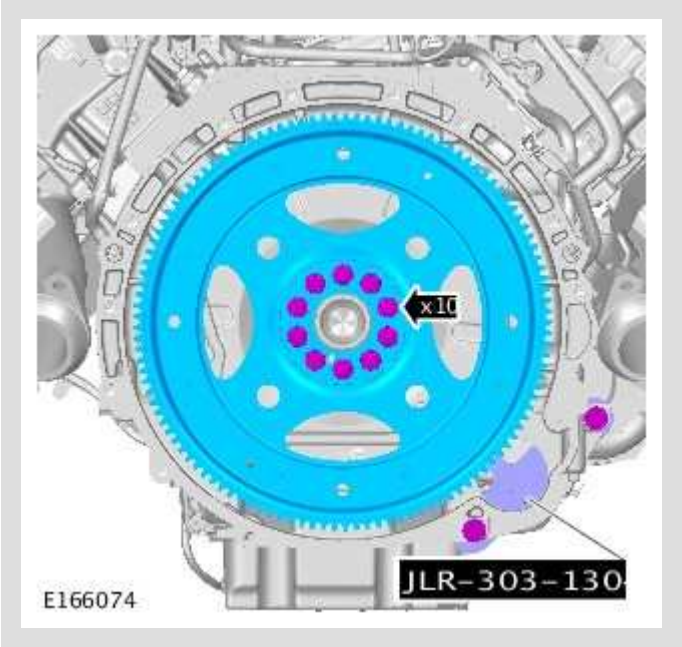
CAUTIONS:

- The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
- Make sure that no components fall off during removal.

NOTE:

Make sure that the crankshaft is not rotated.

cardiagn.com



Special Tool(s): JLR-303-1304

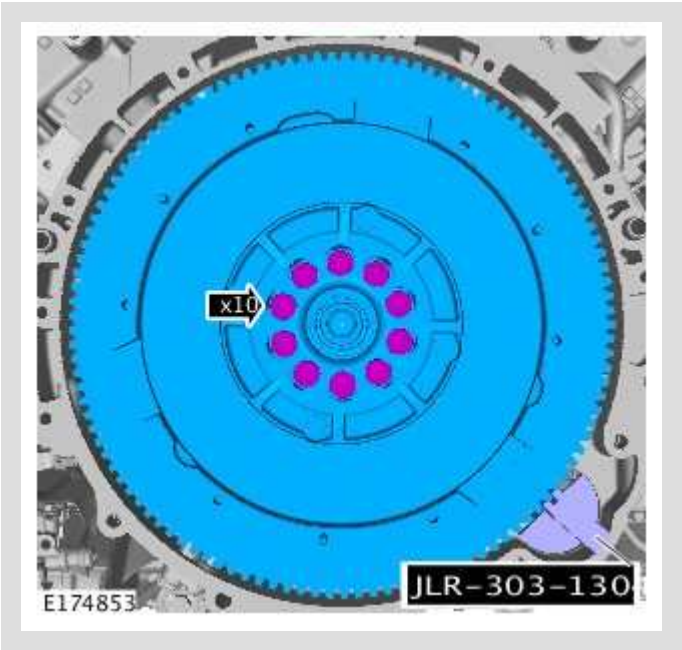
	Vehicles with manual transmission

1.

CAUTION:

Discard the bolts

cardiagn.com

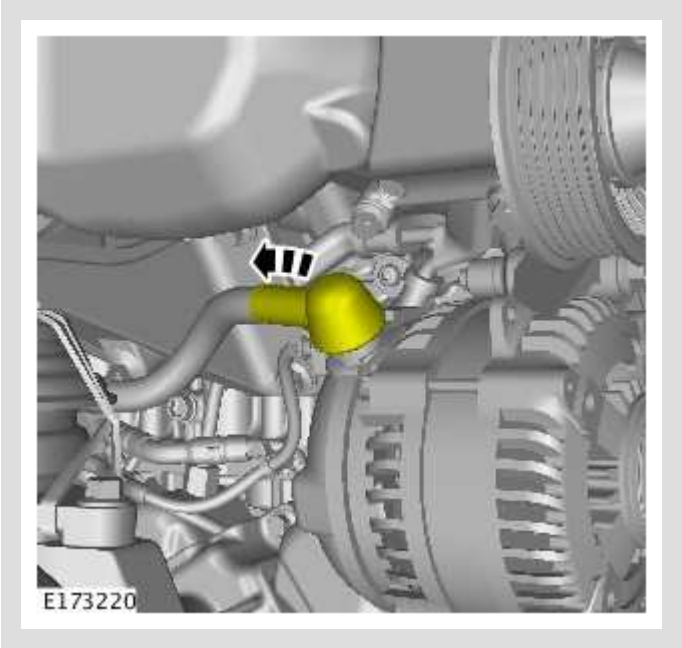


Special Tool(s): JLR-303-1304

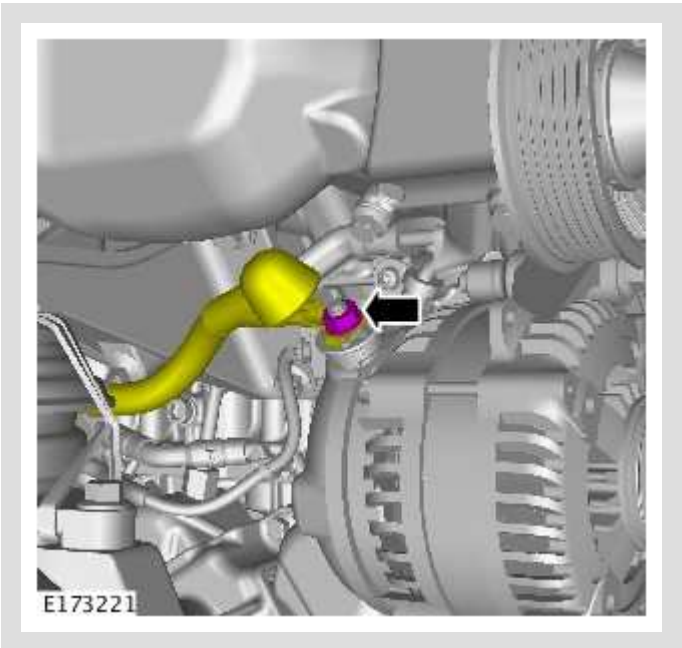
All vehicles

1.

cardiagn.com

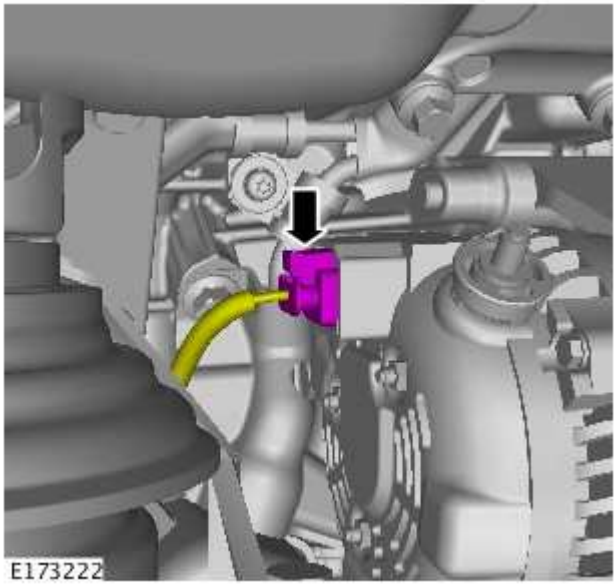


2.

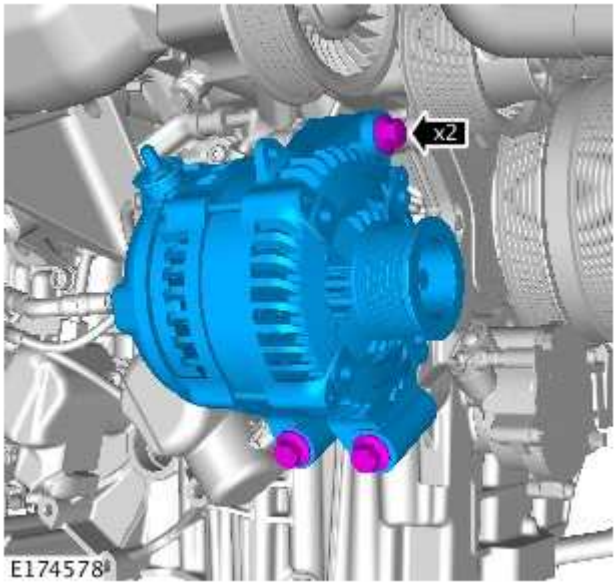


cardiagn.com

3.

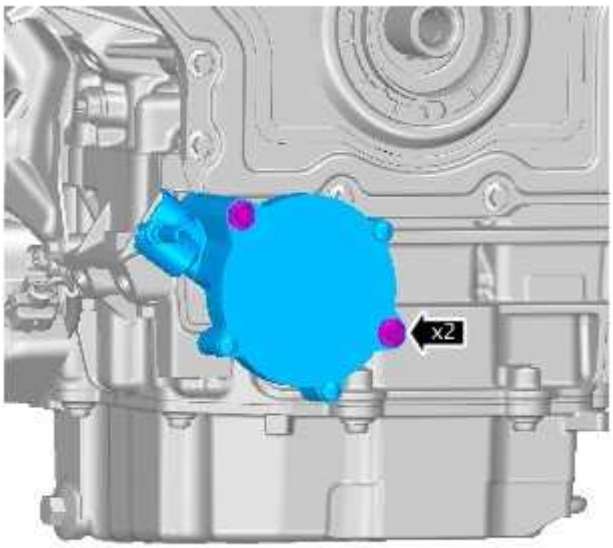


4.



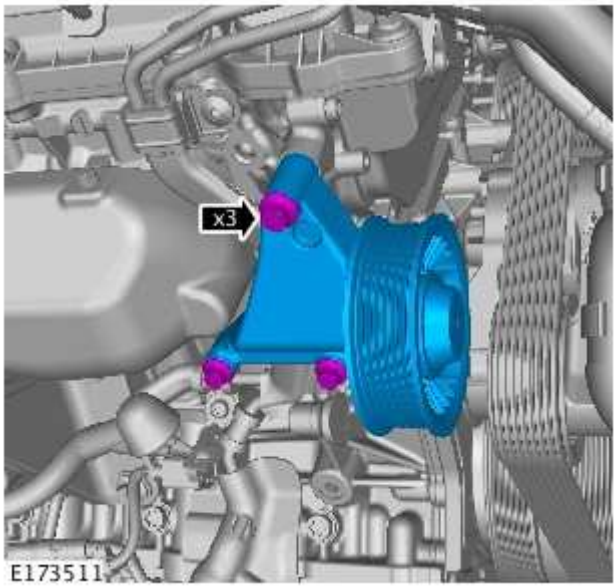
5.

cardiagn.com



E165937

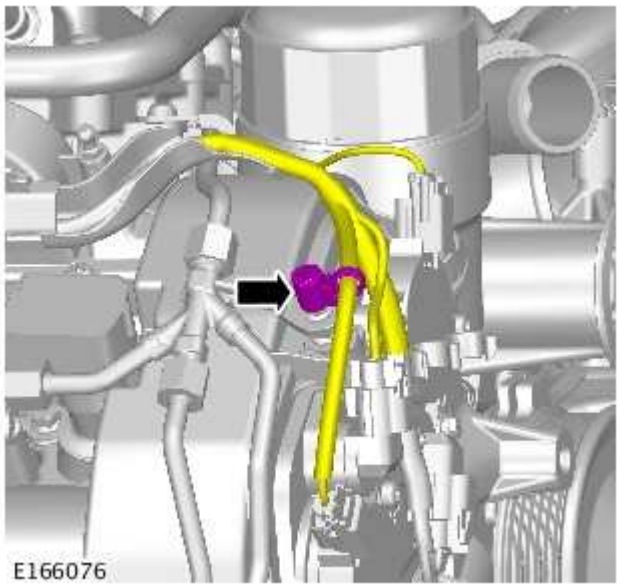
6.



E173511

cardiagn.com

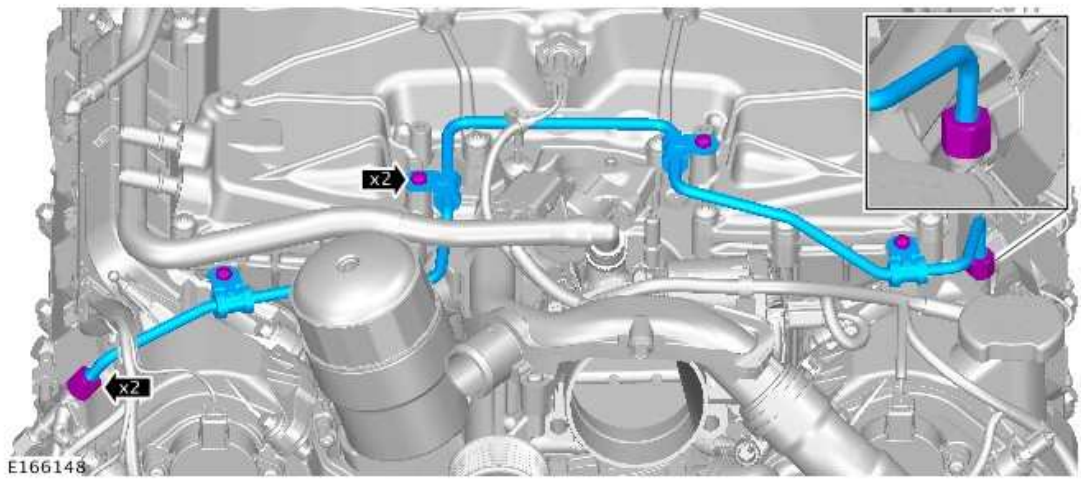
7.



8.

CAUTIONS:

- Be prepared to collect escaping fuel.
- This fuel pipe can be re-used, inspect for signs of damage. Renew if necessary.
- Make sure that all openings are sealed. Use new blanking caps.

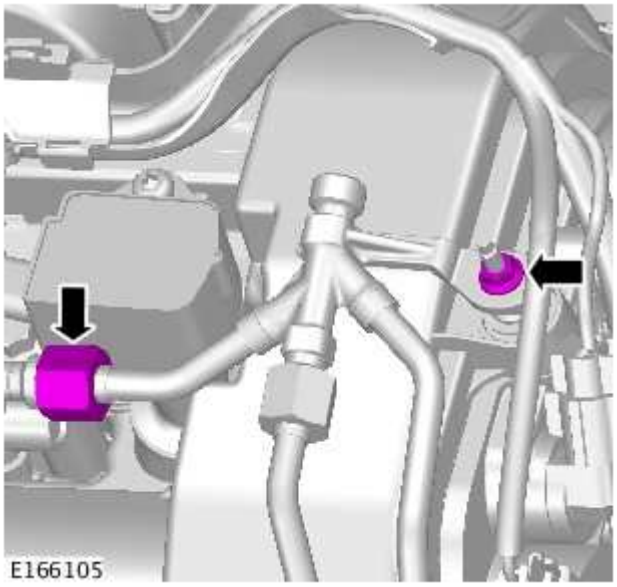


9.

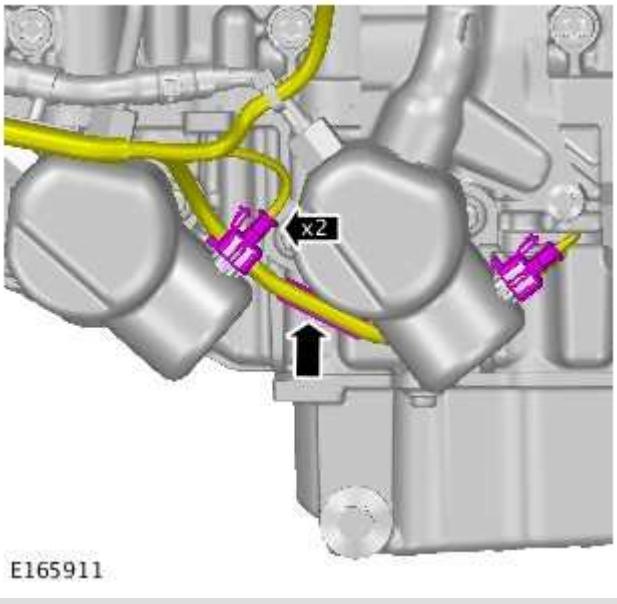
CAUTIONS:

cardiagn.com

- Be prepared to collect escaping fuel.
- Make sure that all openings are sealed. Use new blanking caps.

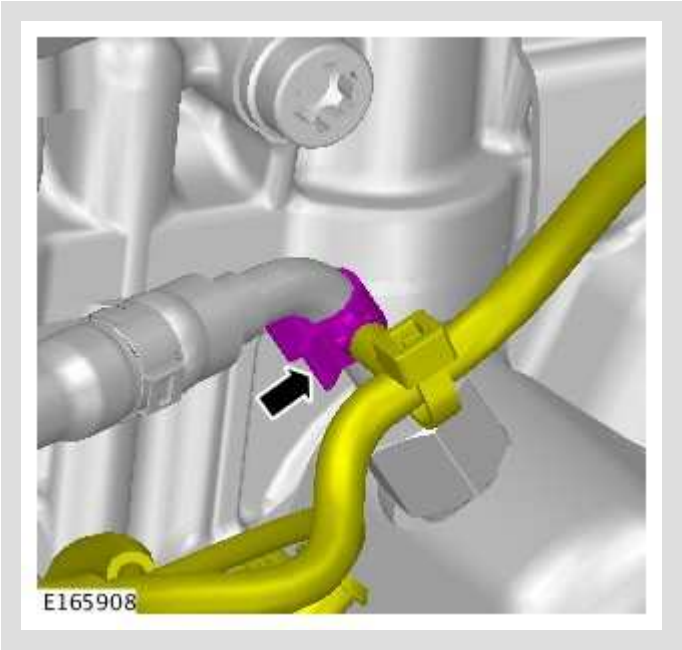


10.

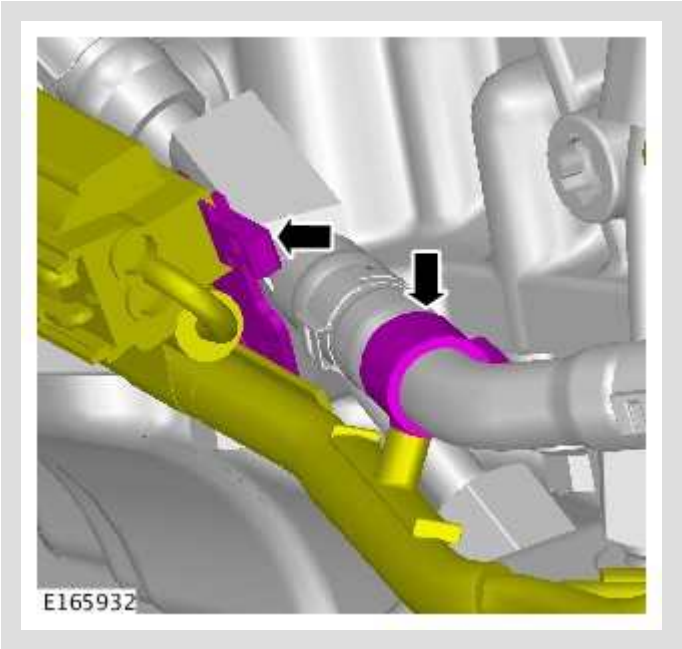


11.

cardiagn.com

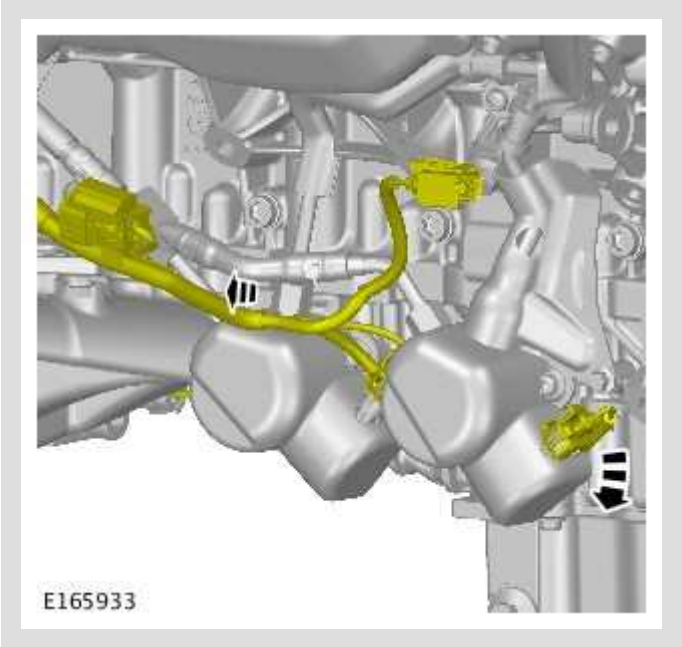


12.

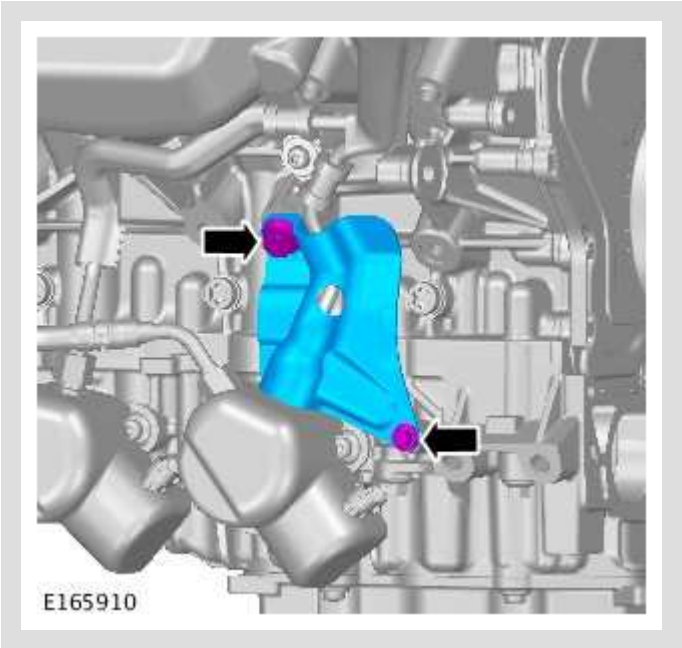


13.

cardiagn.com

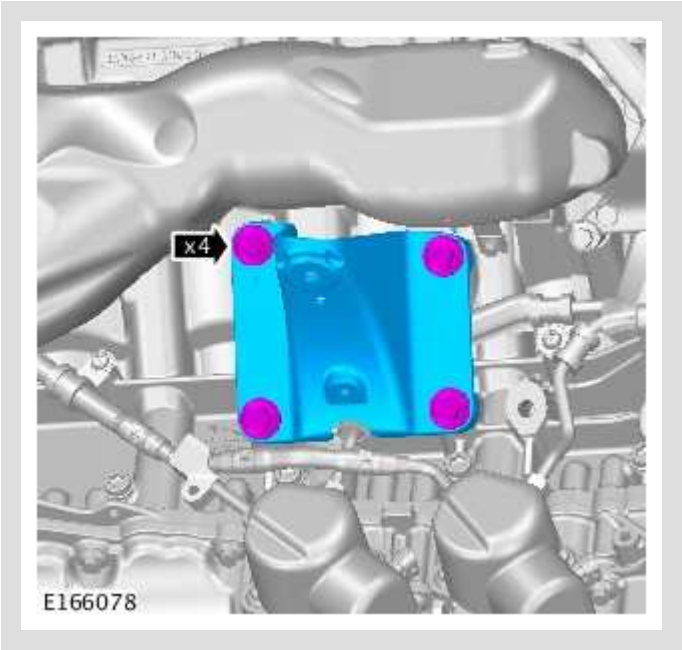


14.



15.

cardiagn.com

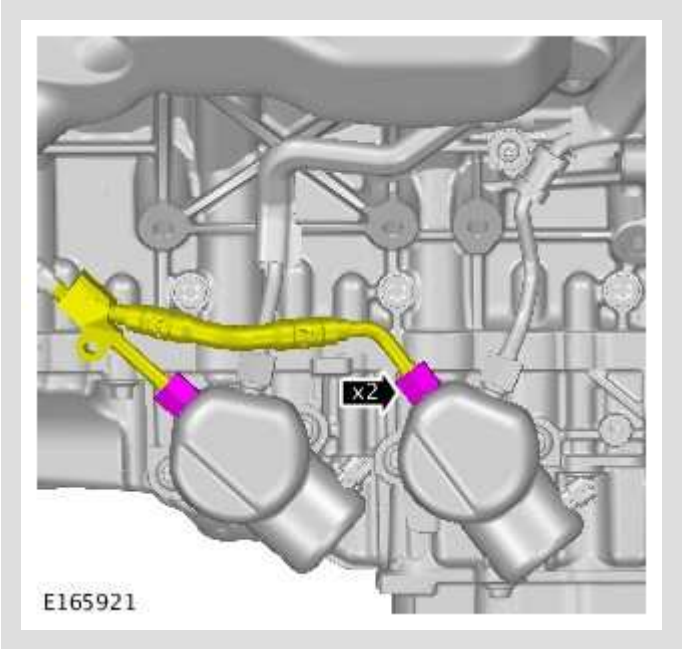


16.

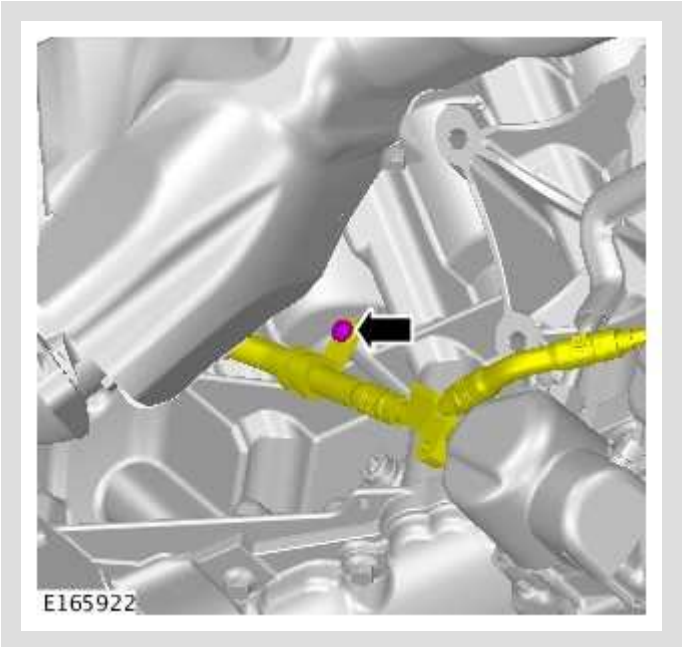
CAUTIONS:

- Be prepared to collect escaping fuel.
- Make sure that all openings are sealed. Use new blanking caps.

cardiagn.com



17.

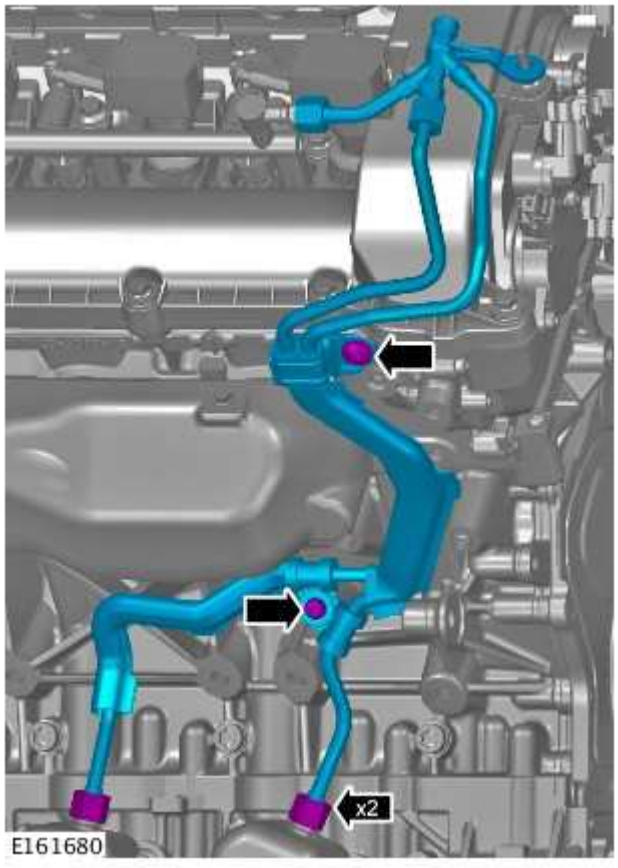


cardiagn.com

18.

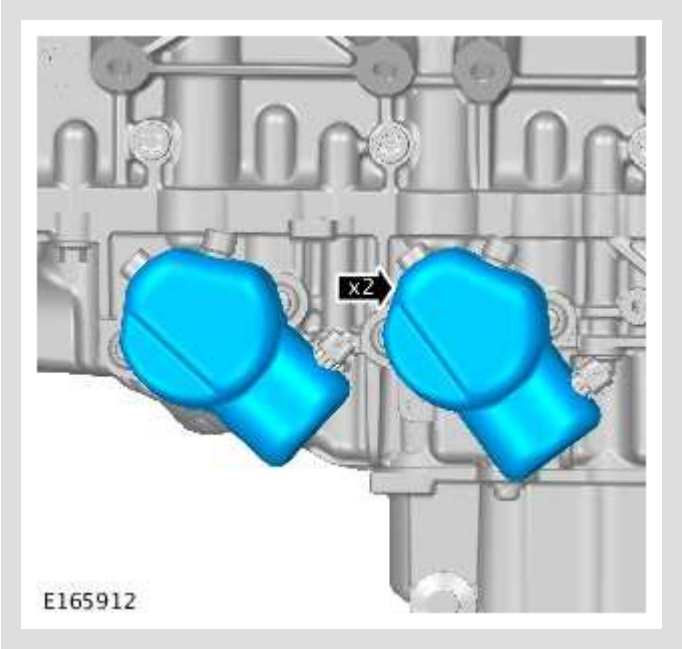
CAUTIONS:

- Be prepared to collect escaping fuel.
- Make sure that all openings are sealed. Use new blanking caps.
- Remove and discard the high-pressure fuel supply lines.



19.

cardiagn.com

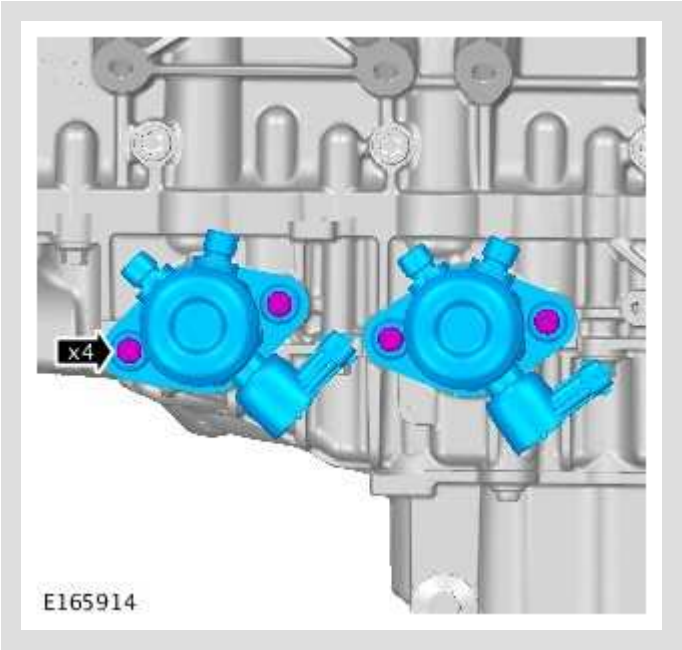


20.

CAUTION:

Be prepared to collect escaping oil.

cardiagn.com

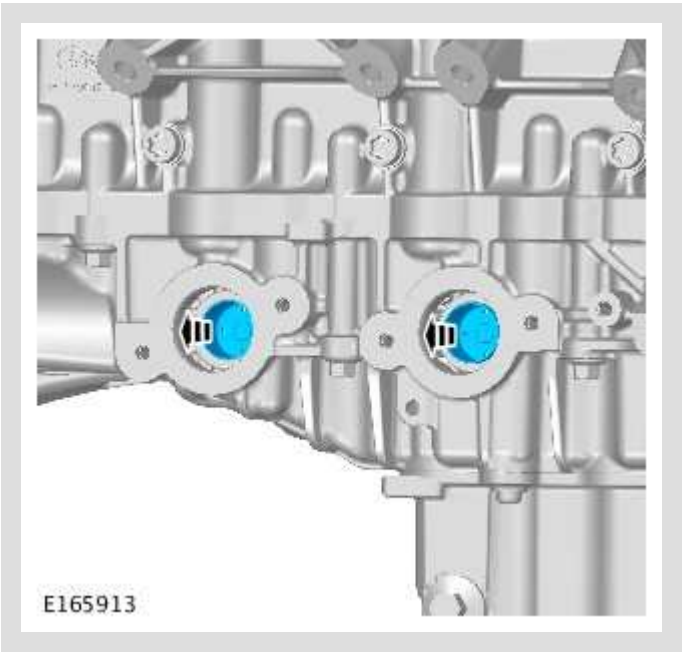


21.

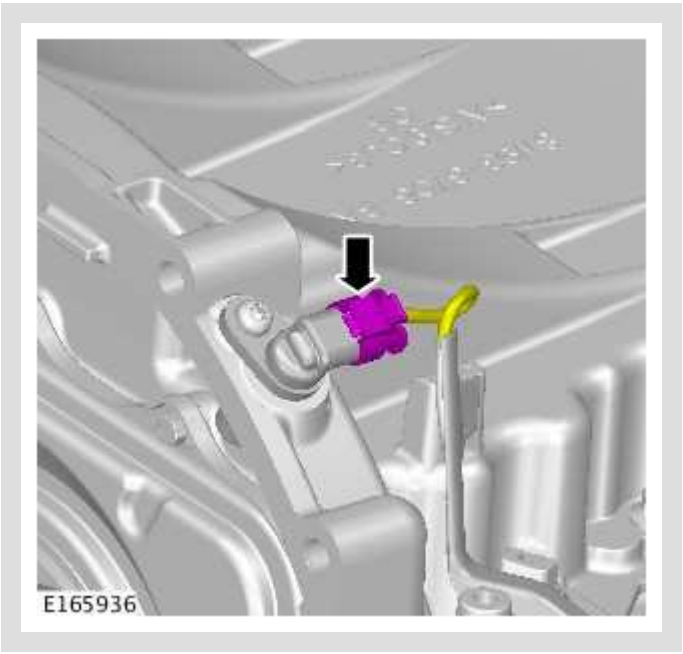
CAUTION:

Be prepared to collect escaping oil.

cardiagn.com

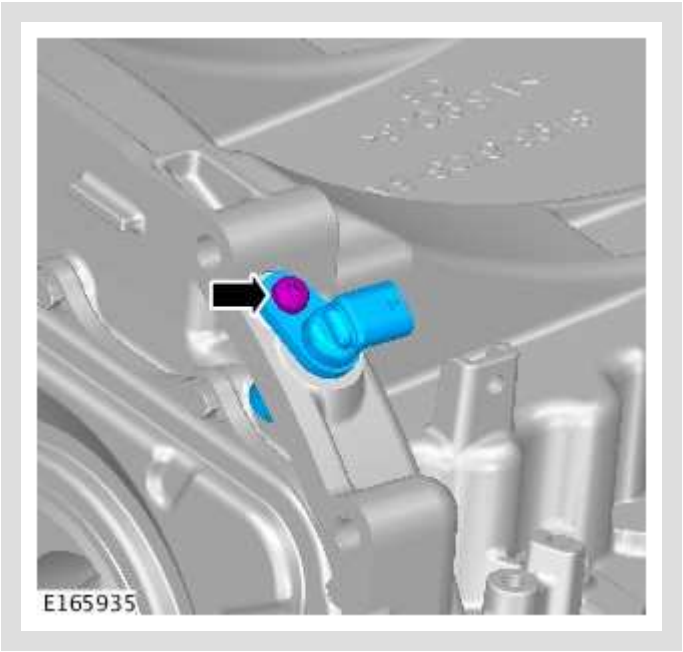


22.

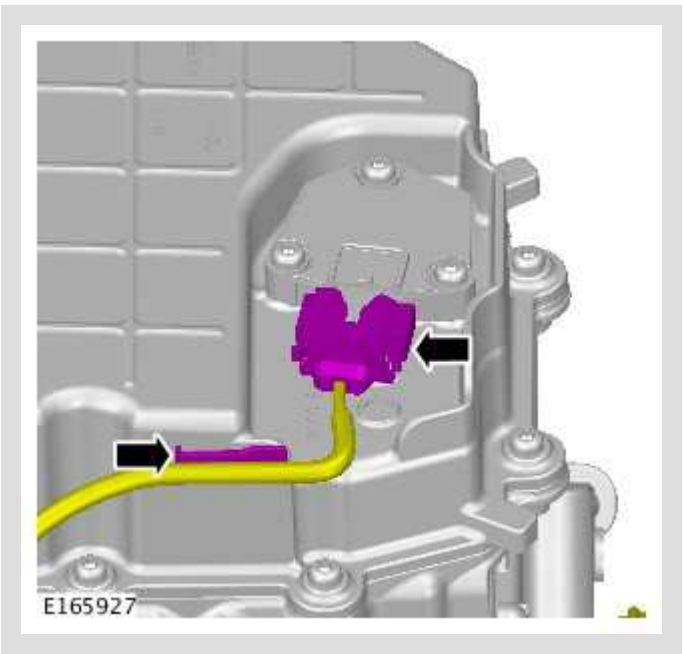


cardiagn.com

23.

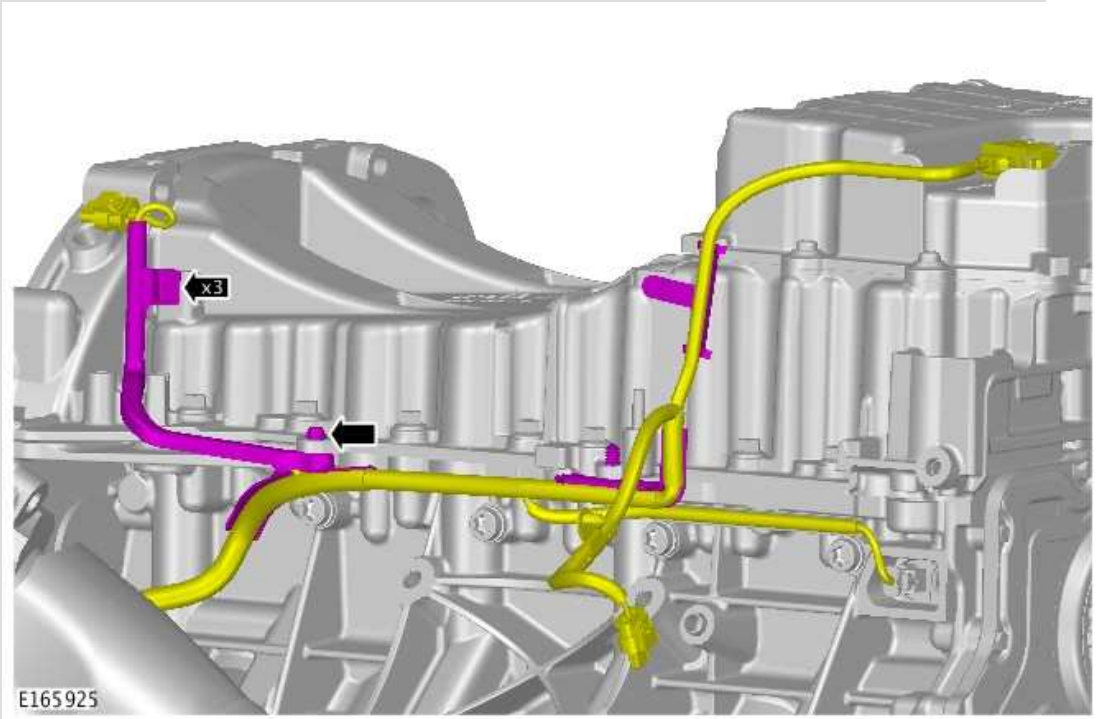


24.



25.

cardiagn.com

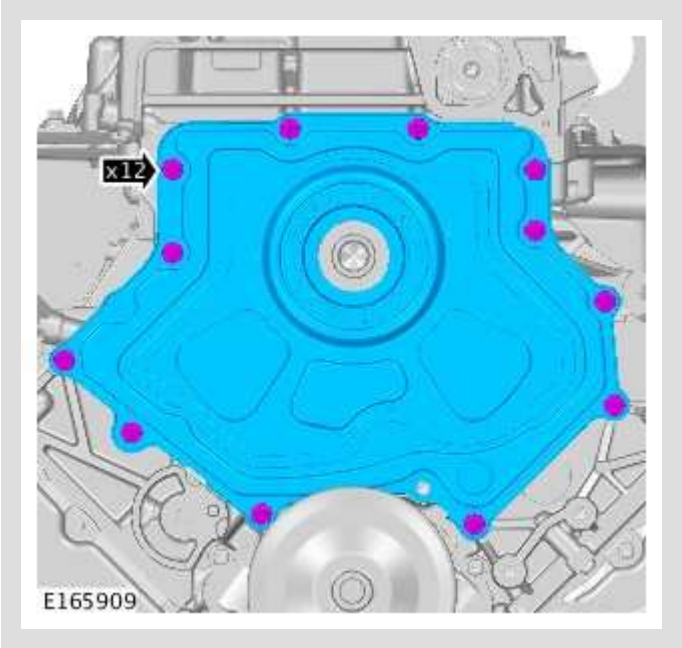


26.

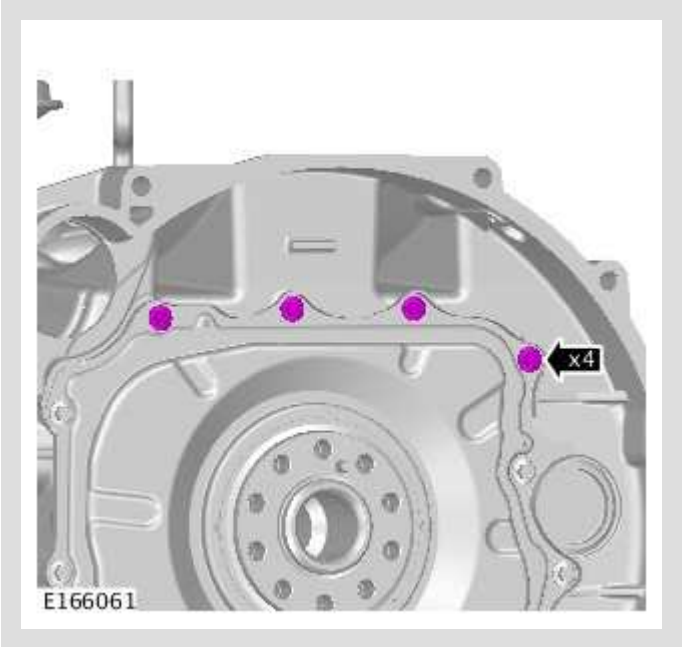
CAUTION:

Discard the component.

cardiagn.com



27.



28.

CAUTION:

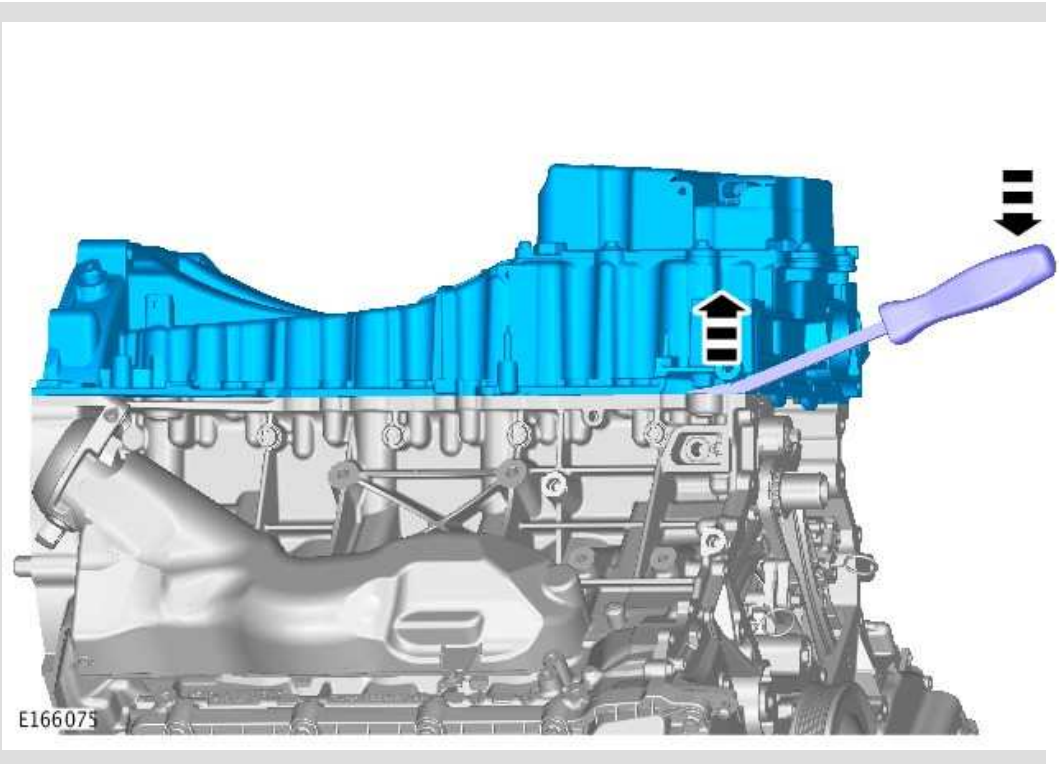
Note the position of the bolts indicated prior to removal.

cardiagn.com

29.

NOTE:

Make sure to use the aluminium lug provided on the oil pan extension to lever against.

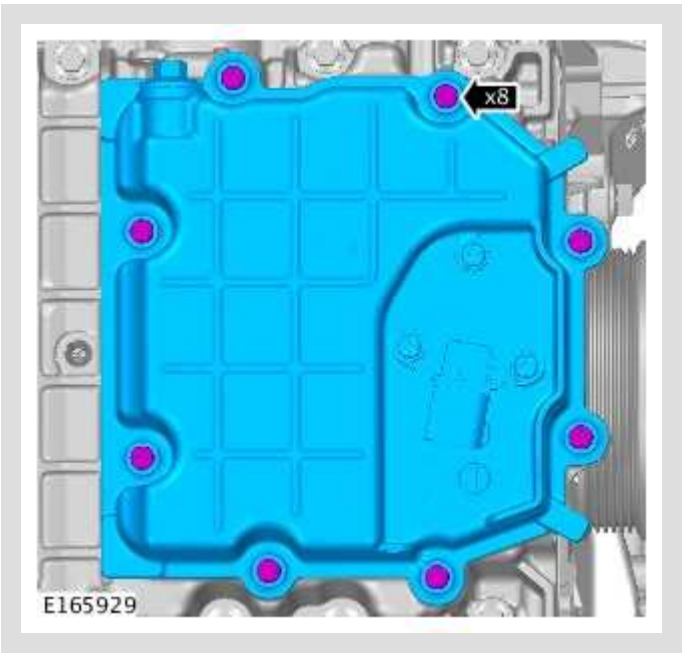


cardiagn.com

30.

NOTE:

Do not disassemble further if the component is removed for access only.

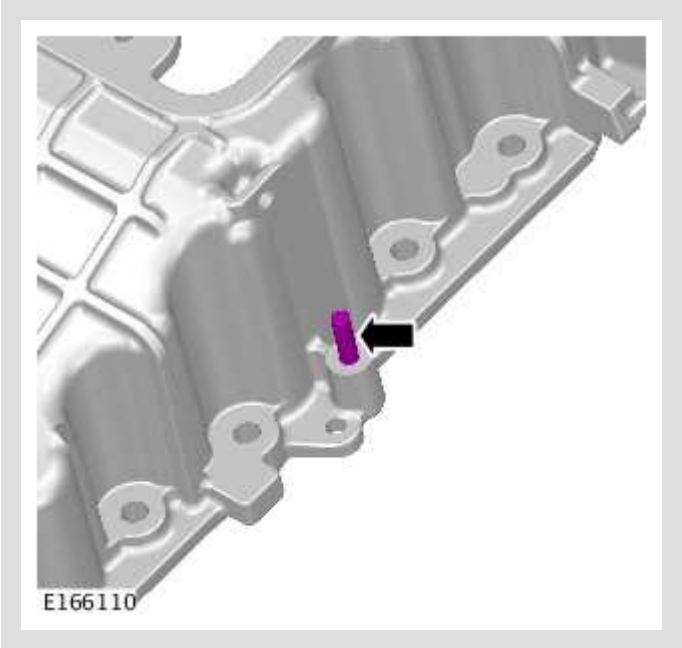


31.

NOTE:

Do not disassemble further if the component is removed for access only.

cardiagn.com



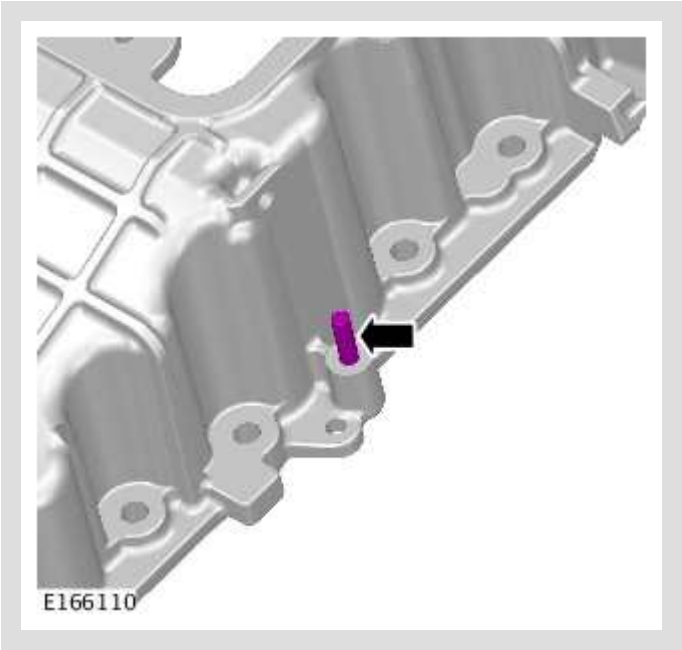
INSTALLATION

1.

NOTE:

This step is only necessary when installing a new oil pan extension.

cardiagn.com



Torque: **8 Nm**

2.

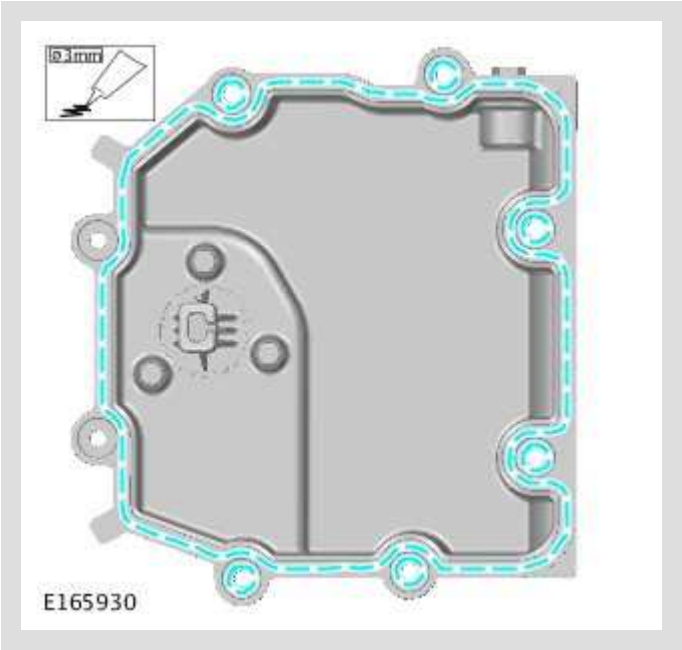
CAUTIONS:

- Make sure that the mating faces are clean and free of foreign material.
- Use only a plastic scraper when removing the sealing material.

NOTE:

This step is only necessary when installing a new oil pan extension.

cardiagn.com



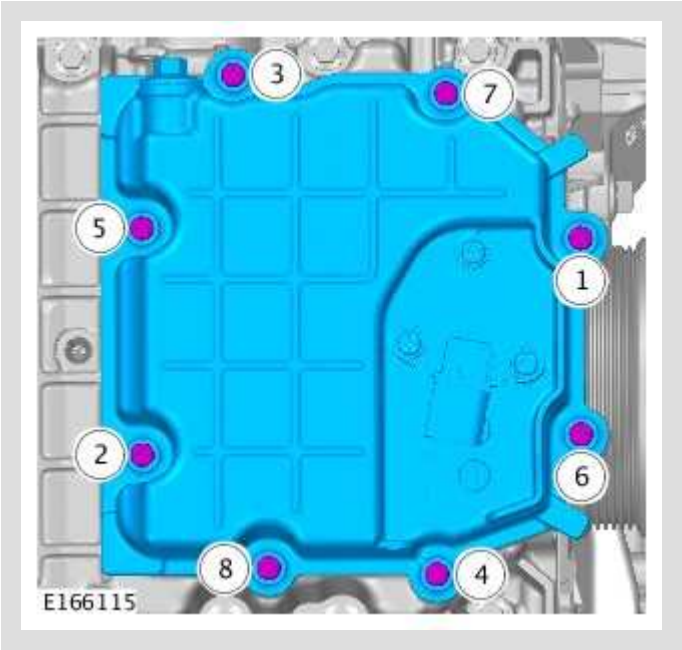
Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and install the oil pan within 7 minutes.

3.

NOTES:

- This step is only necessary when installing a new oil pan extension.
- Tighten the bolts in the indicated sequence.

cardiagn.com



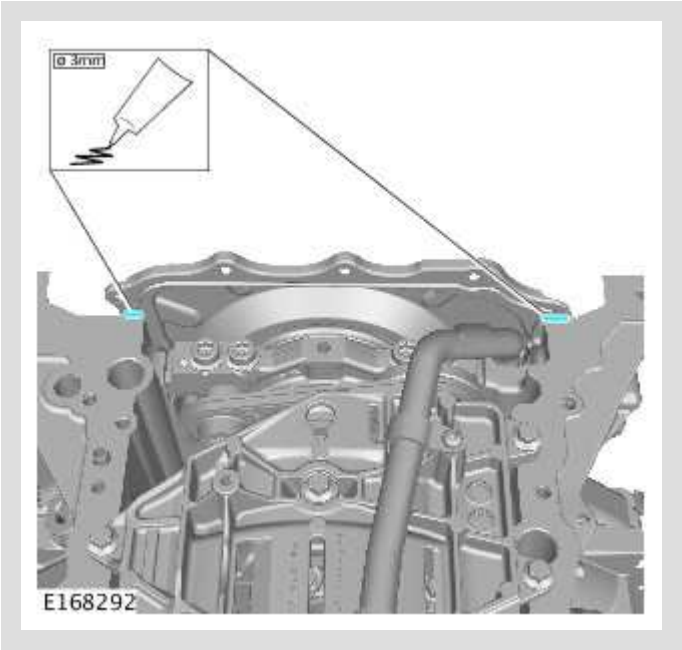
Torque: **12 Nm**

4.

CAUTION:

Use only a plastic scraper when removing the sealing material.

cardiagn.com



Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and install the oil pan extension within 7 minutes.

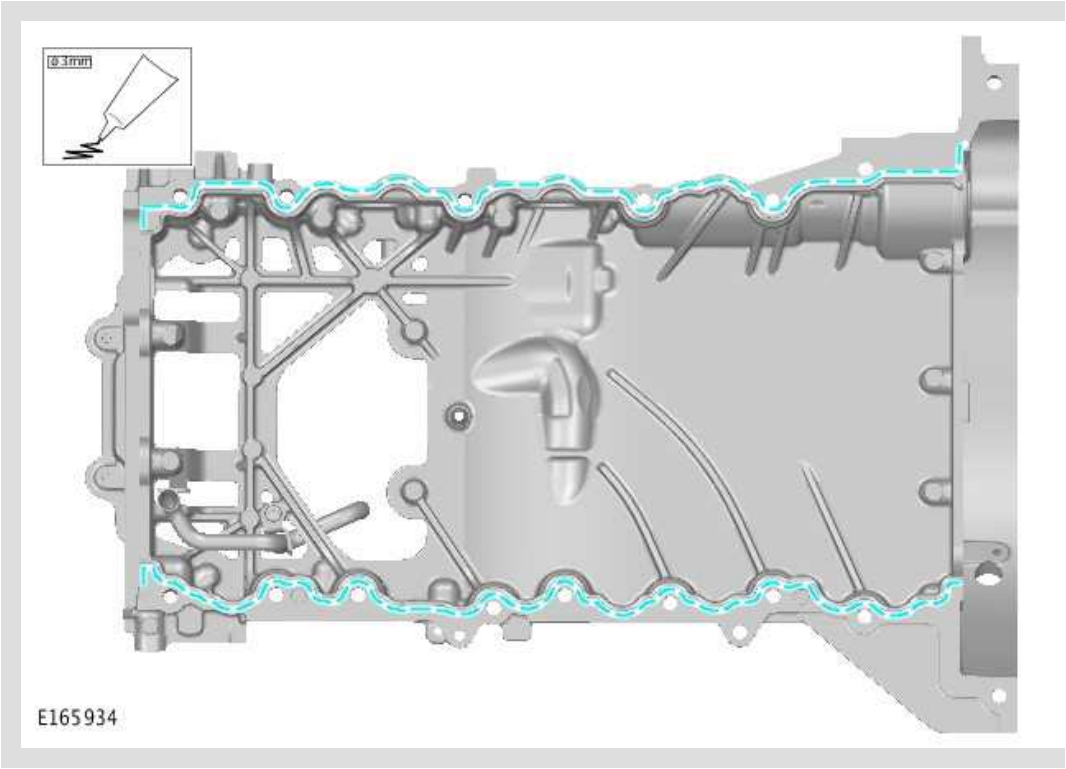
5.

CAUTIONS:

Make sure that the mating faces are clean and free of foreign material.

Use only a plastic scraper when removing the sealing material.

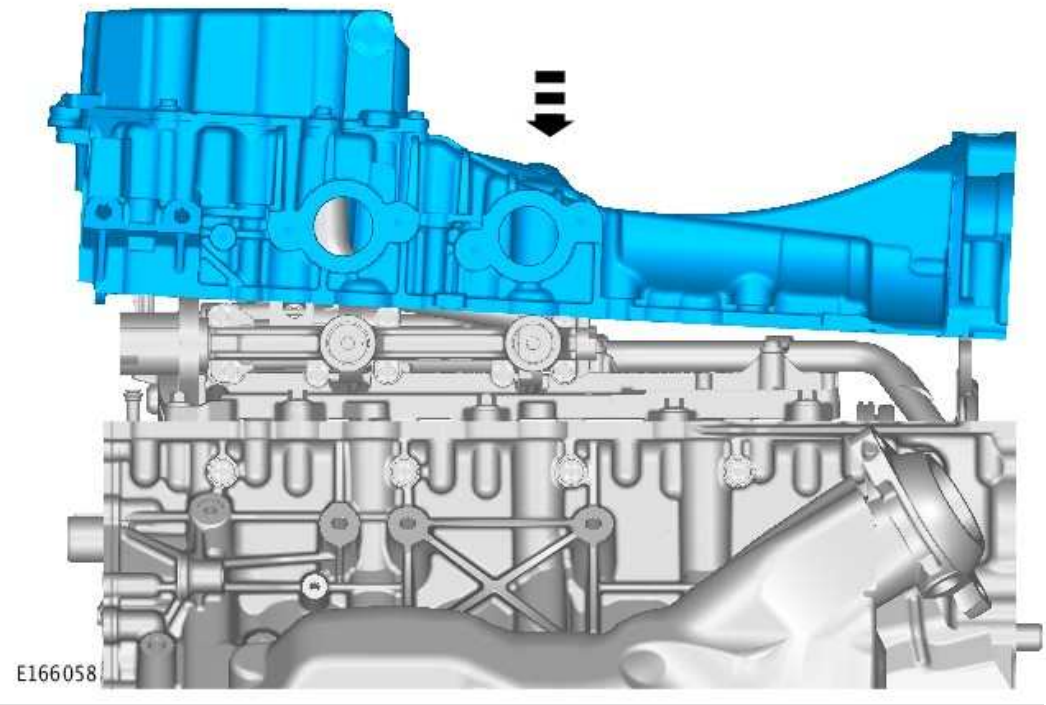
cardiagn.com



Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and tighten the bolts within 7 minutes.

6.

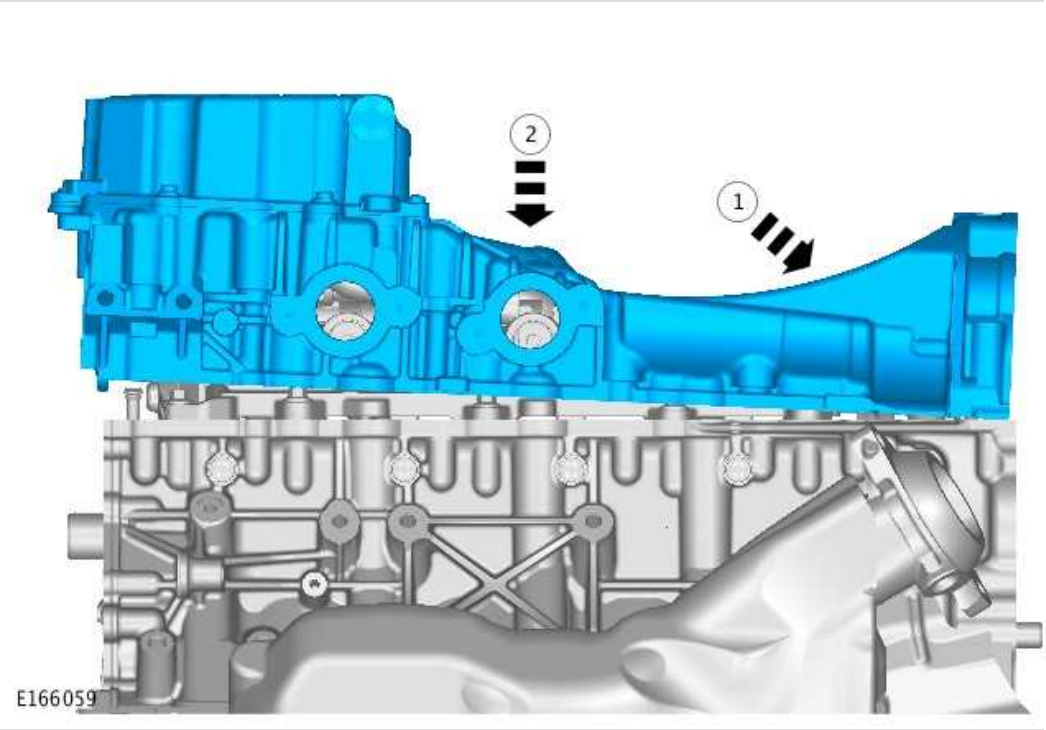
cardiagn.com



7.

CAUTION:

Install the component in the sequence shown.

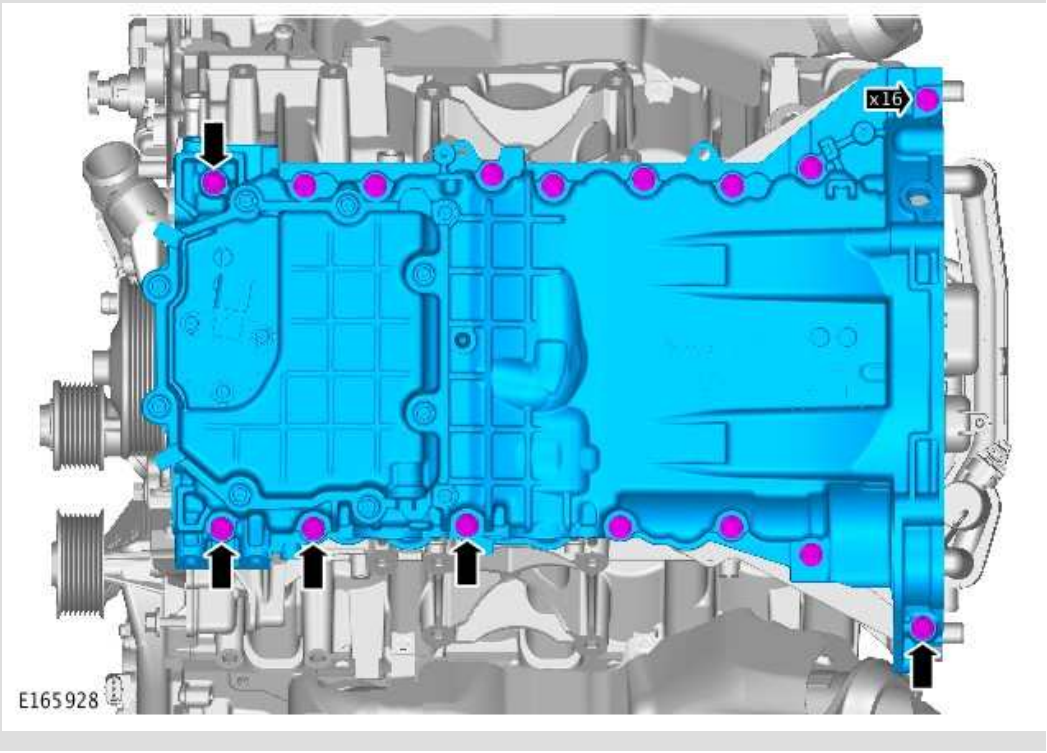


8.

CAUTIONS:

cardiagn.com

- Install the bolts in the positions noted on removal.
- Only tighten the bolts finger tight at this stage.



9.

NOTE:

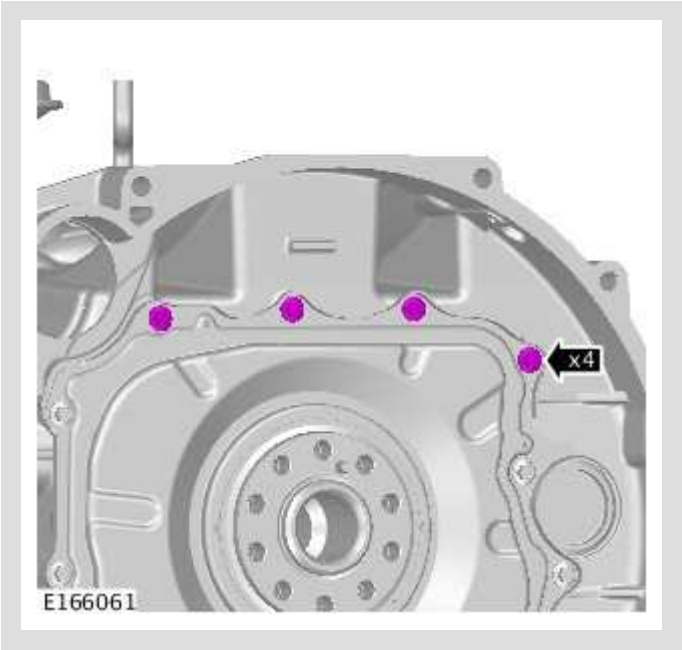
Tighten the bolts in the indicated sequence.

cardiagn.com

Torque: **25 Nm**

10.

cardiagn.com



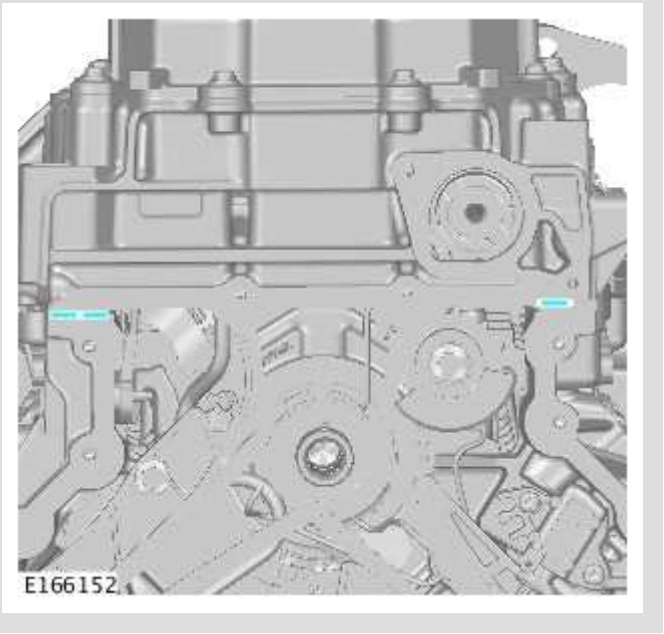
Torque: **12 Nm**

11.

CAUTIONS:

- Make sure that the mating faces are clean and free of foreign material.
- Use only a plastic scraper when removing the sealing material.

cardiagn.com



Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and install the lower timing cover within 7 minutes.

12.

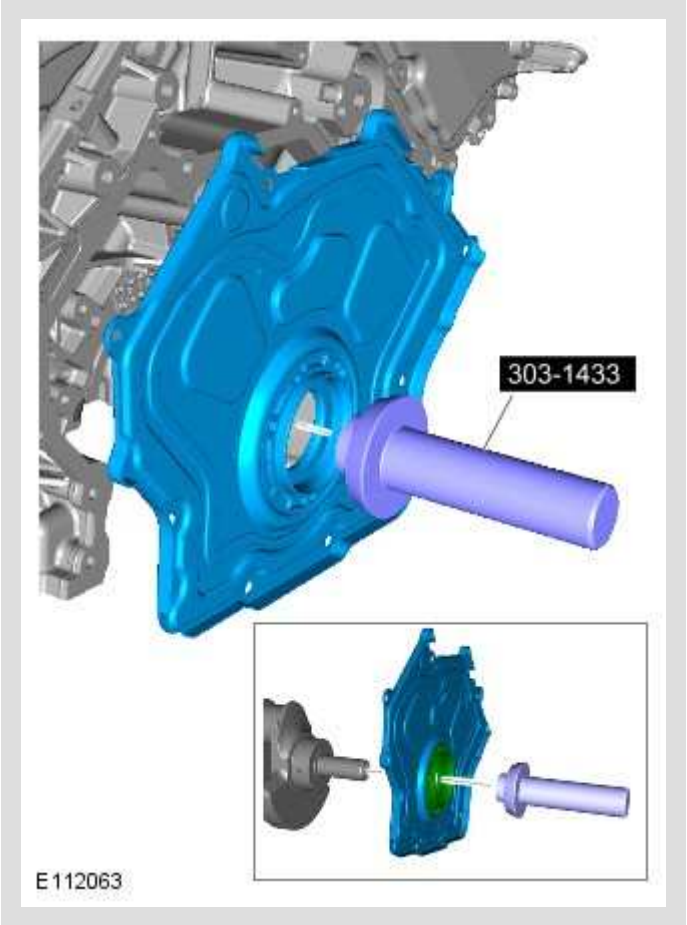
CAUTION:

Make sure that the mating faces are clean and free of foreign material.

NOTE:

Install a new lower timing cover.

cardiagn.com



Install the bolts, but do not tighten fully at this stage.
Special Tool(s): 303-1433

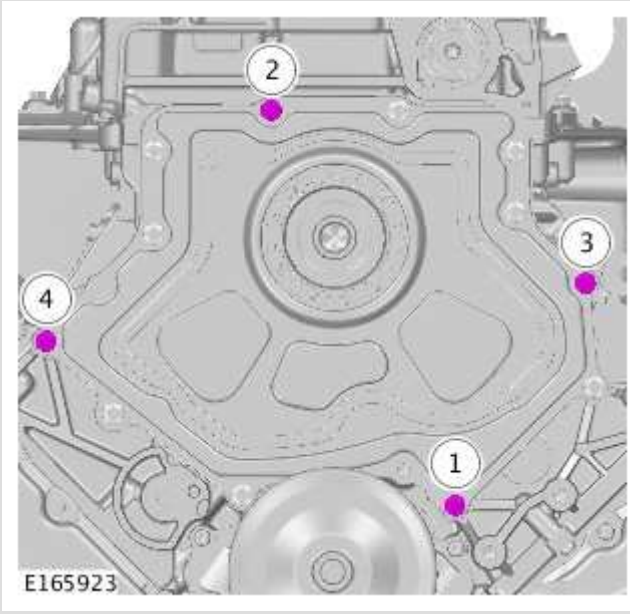
13.

NOTES:

Tighten the bolts in the indicated sequence.

Special tools shown removed for clarity.

cardiagn.com

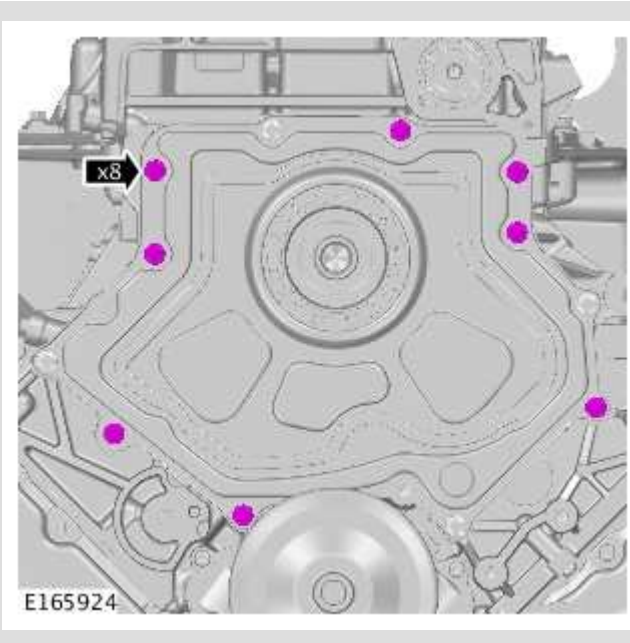


Torque: **12 Nm**

14.

NOTE:

Special tools shown removed for clarity.

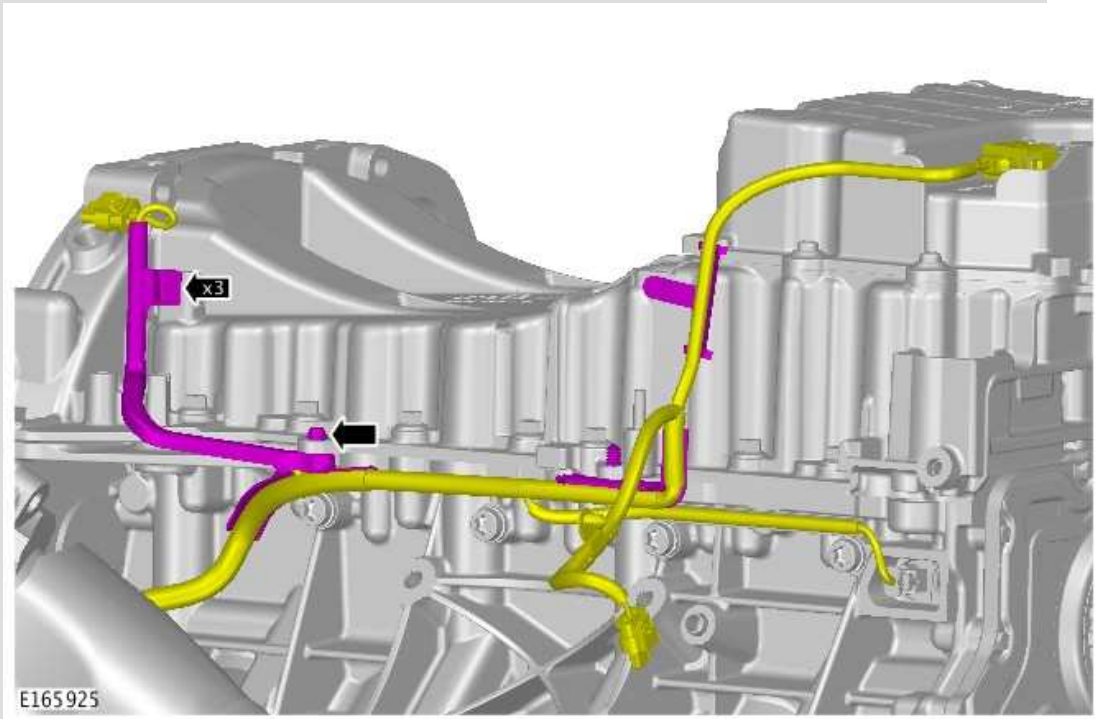


cardiagn.com

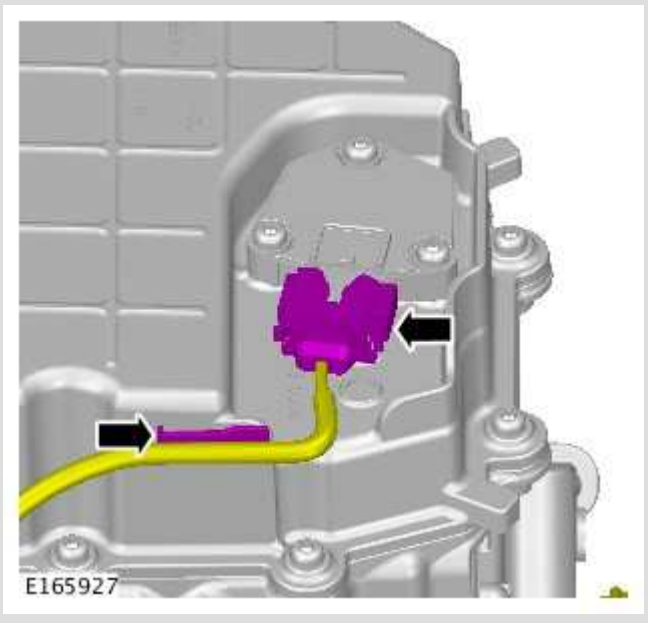
Torque: **12 Nm**

15. Remove the special tools.

16.

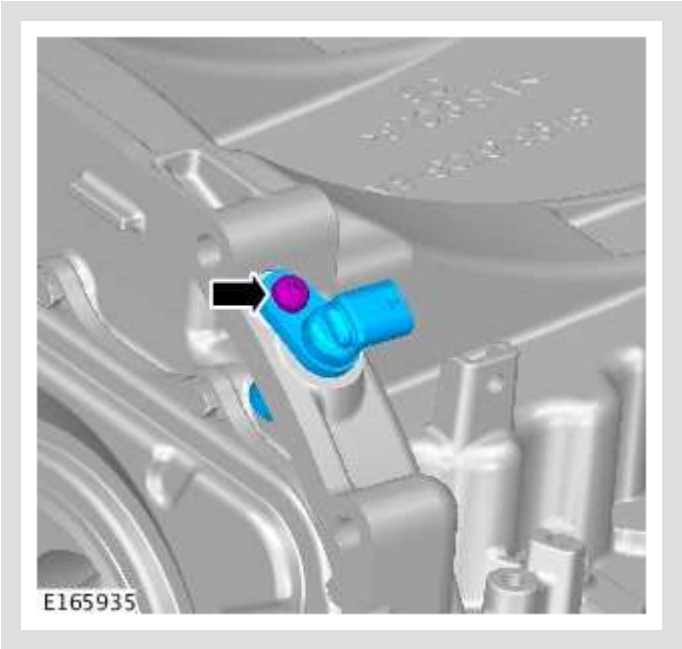


17.



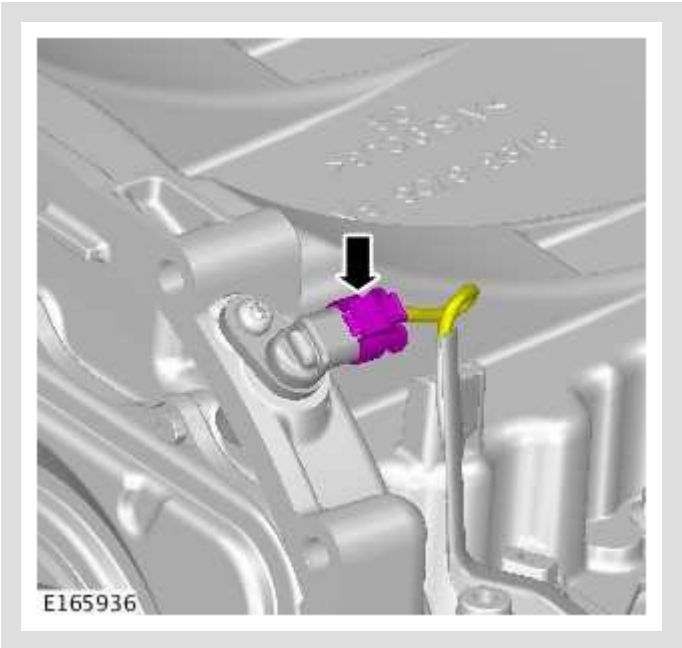
18.

cardiagn.com



Torque: **10 Nm**

19.

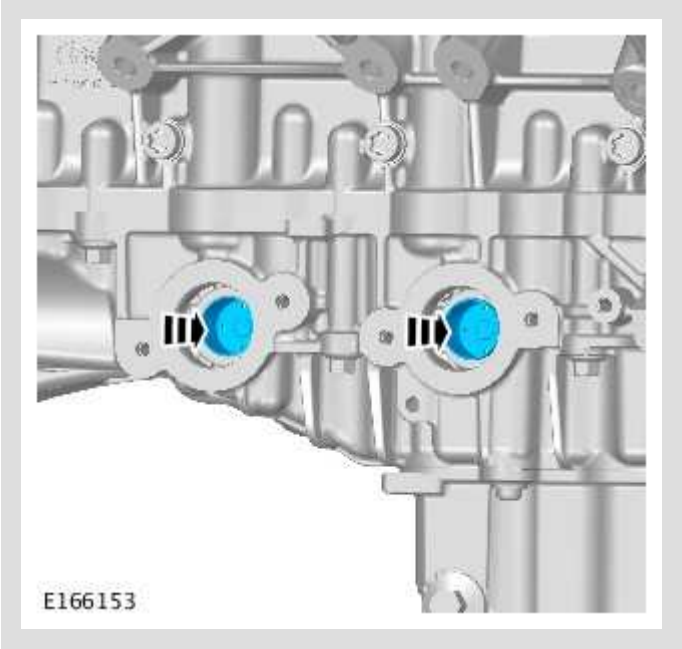


20.

NOTE:

Lubricate the high-pressure fuel pump buckets with clean engine oil.

cardiagn.com



21.

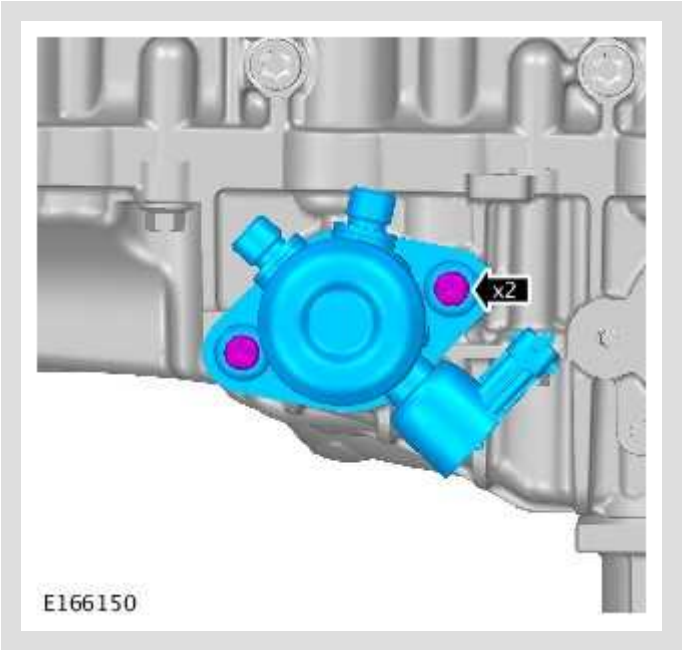
CAUTION:

Tighten the Torx screws a turn at a time until the correct torque is achieved.

NOTE:

Lubricate the high-pressure fuel pump O-ring seal with clean engine oil.

cardiagn.com



Torque: **11 Nm**

22.

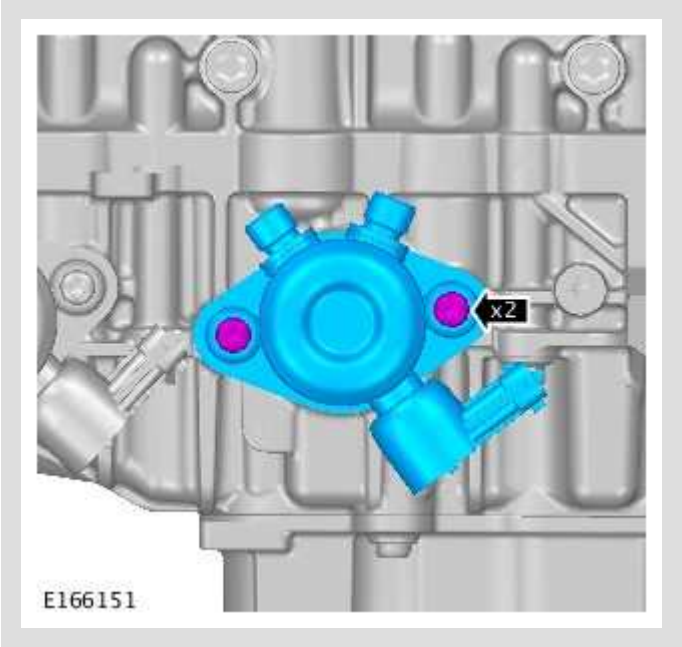
CAUTION:

Tighten the Torx screws a turn at a time until the correct torque is achieved.

NOTE:

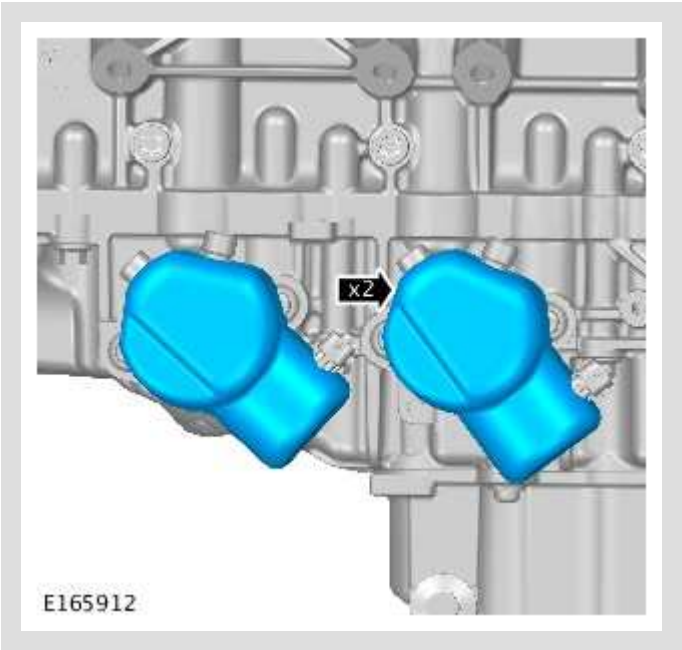
Lubricate the high-pressure fuel pump O-ring seal with clean engine oil.

cardiagn.com



Torque: **11 Nm**

23.



24.

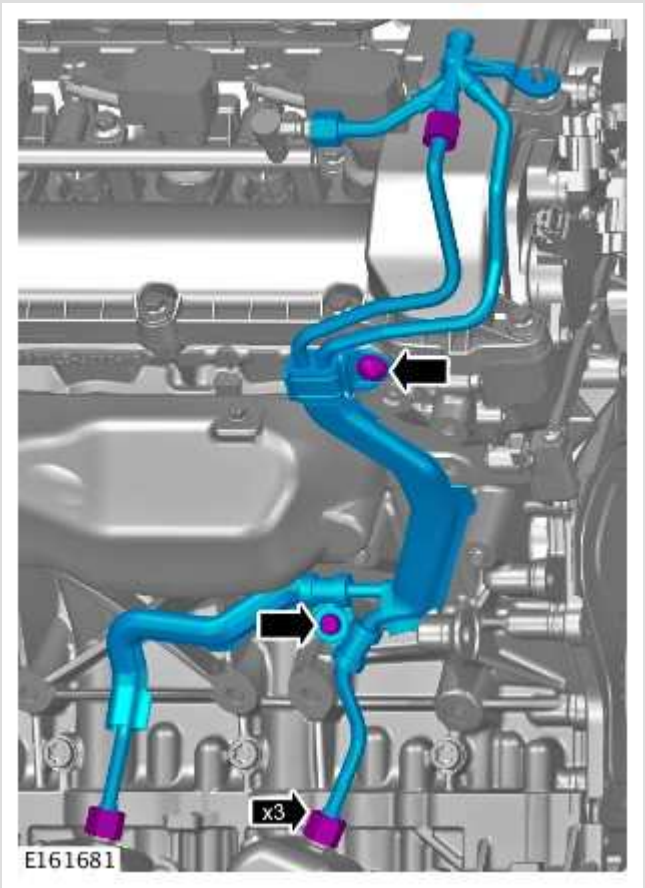
CAUTIONS:

- Install new high-pressure fuel supply lines.
- Lubricate only the union threads with clean engine oil.
- Only tighten the bolts and unions finger tight at this stage.

cardiagn.com

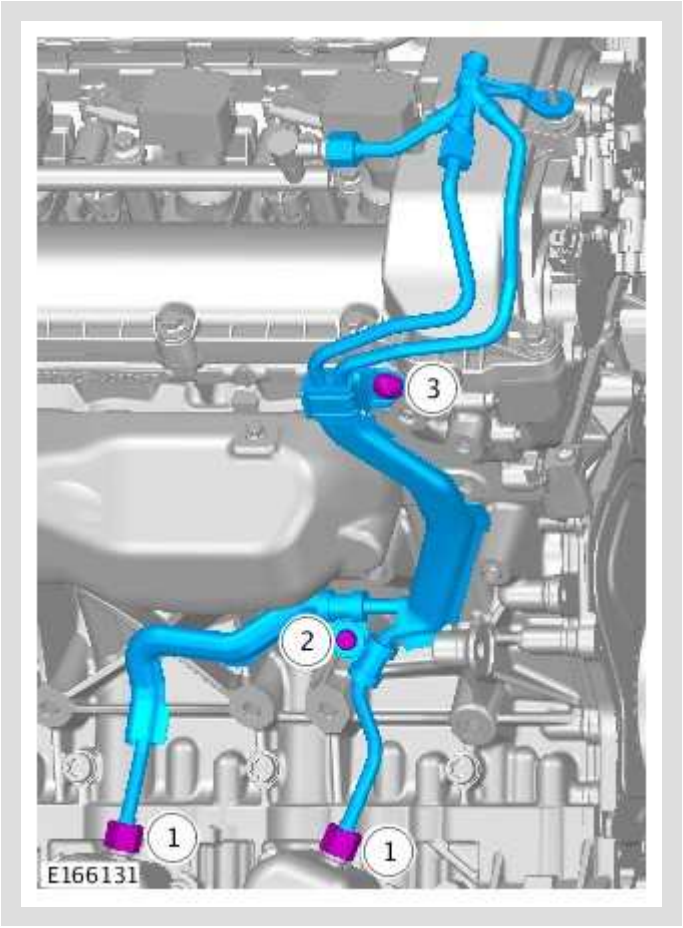
NOTE:

Remove and discard the blanking caps.



25.

cardiagn.com



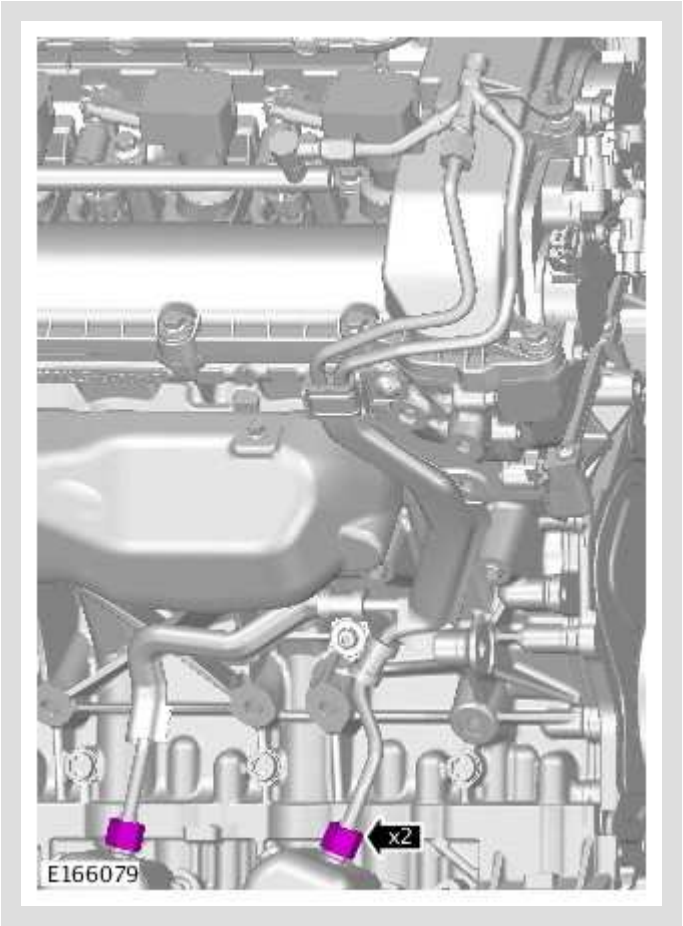
Torque:

Unions (1) **21 Nm**

M6 (2) **11 Nm**

M8 (3) **25 Nm**

cardiagn.com



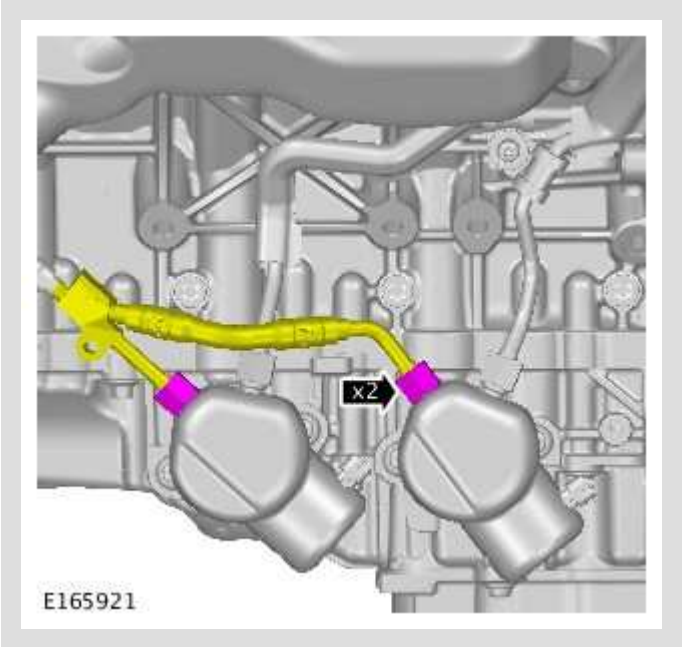
Torque: **21 Nm**

27.

△ **NOTES:**

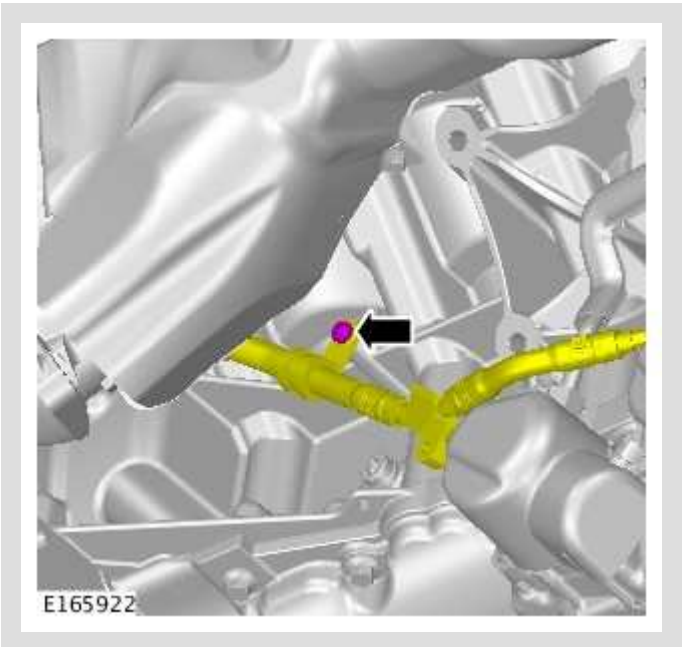
- Install the bolt and unions finger tight before final tightening.
- Remove and discard the blanking caps.

cardiagn.com



Torque: **21 Nm**

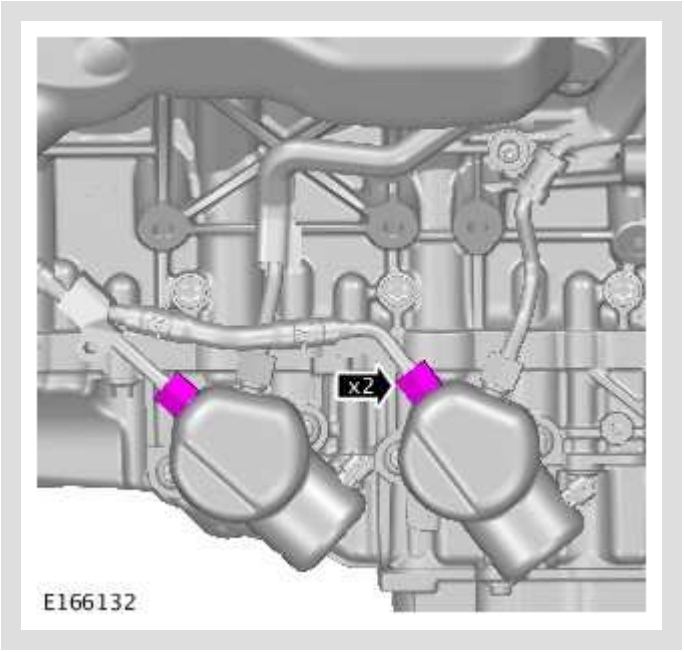
28.



cardiagn.com

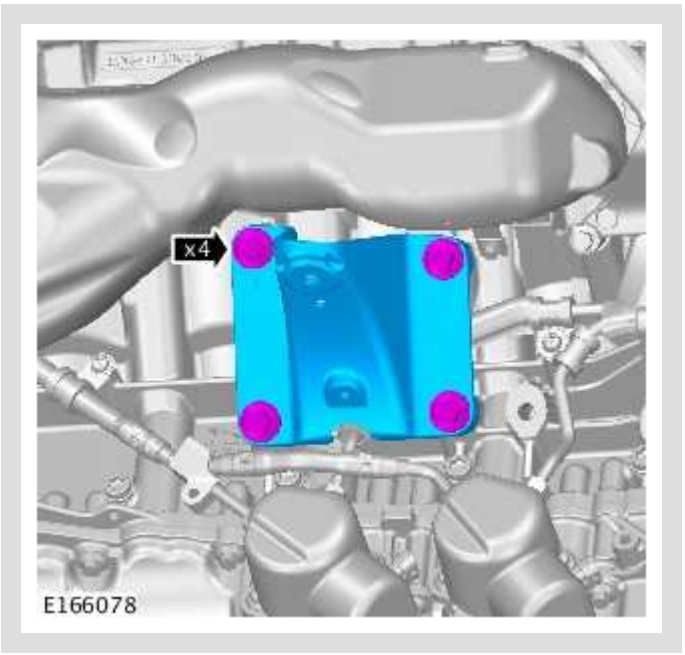
Torque: **11 Nm**

29.



Torque: **21 Nm**

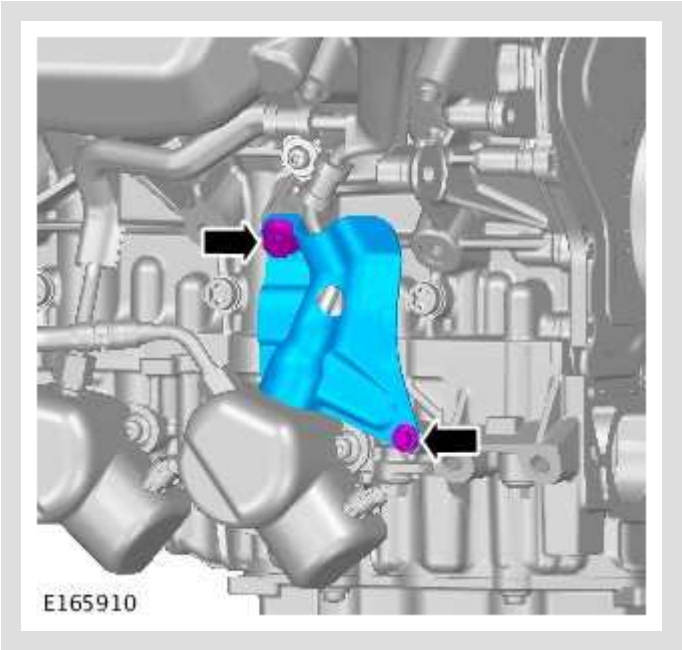
30.



Torque: **48 Nm**

31.

cardiagn.com

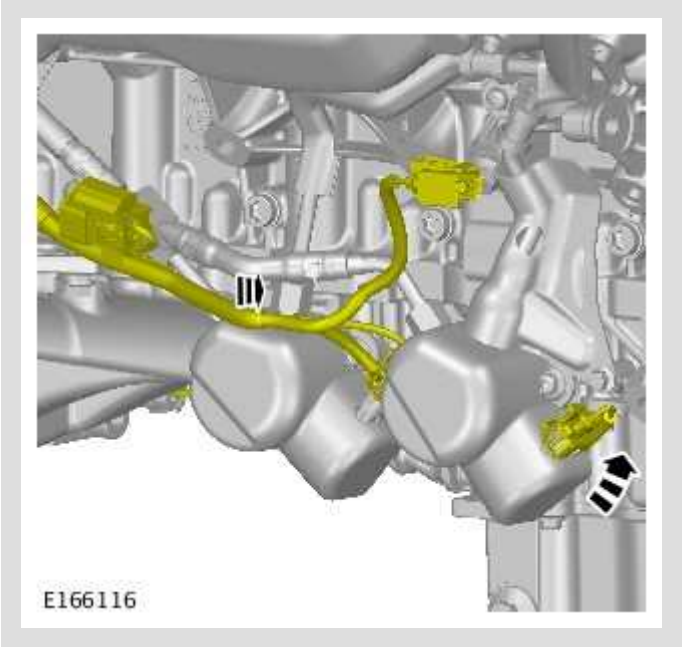


Torque:

M10 **29 Nm**

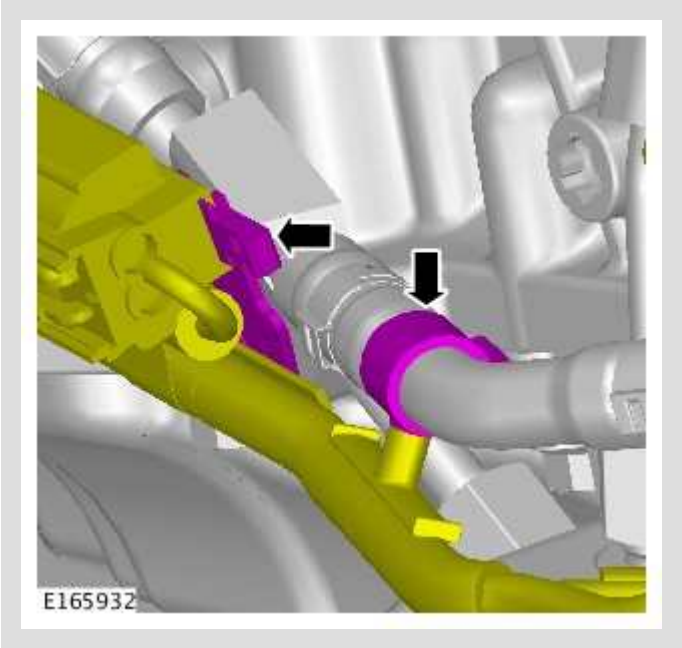
M6 **11 Nm**

32.

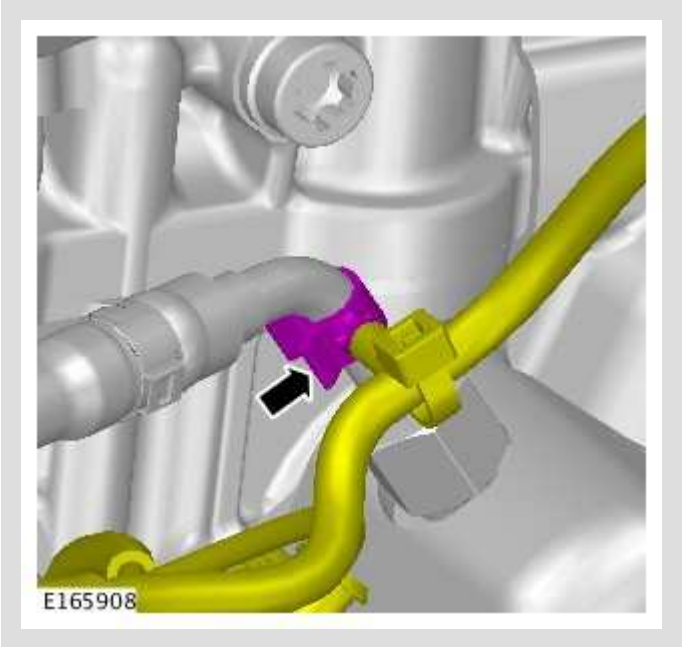


cardiagn.com

33.

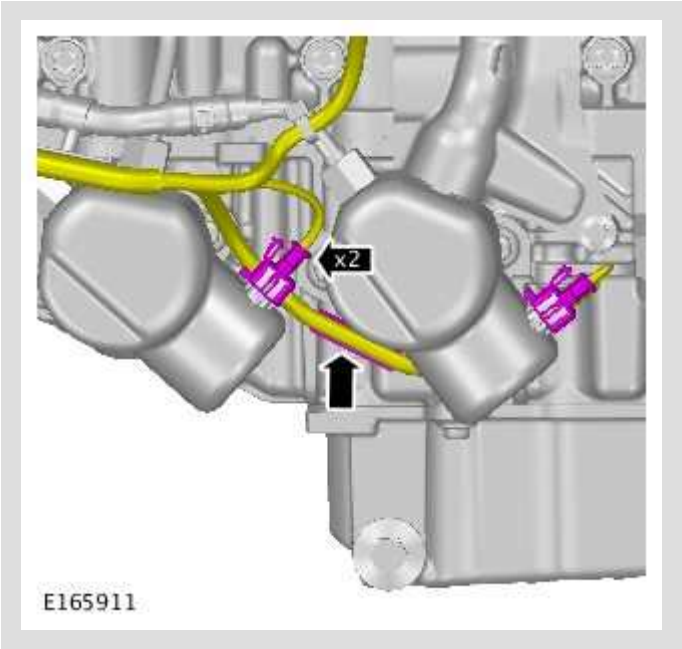


34.



35.

cardiagn.com

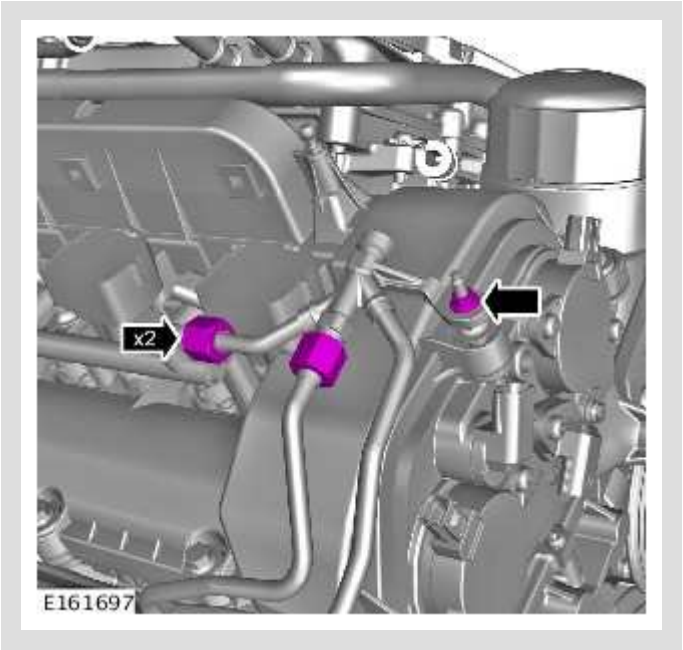


36.

NOTES:

- Install the nut and unions finger tight before final tightening.
- Remove and discard the blanking caps.

cardiagn.com



Torque:

Unions **21 Nm**

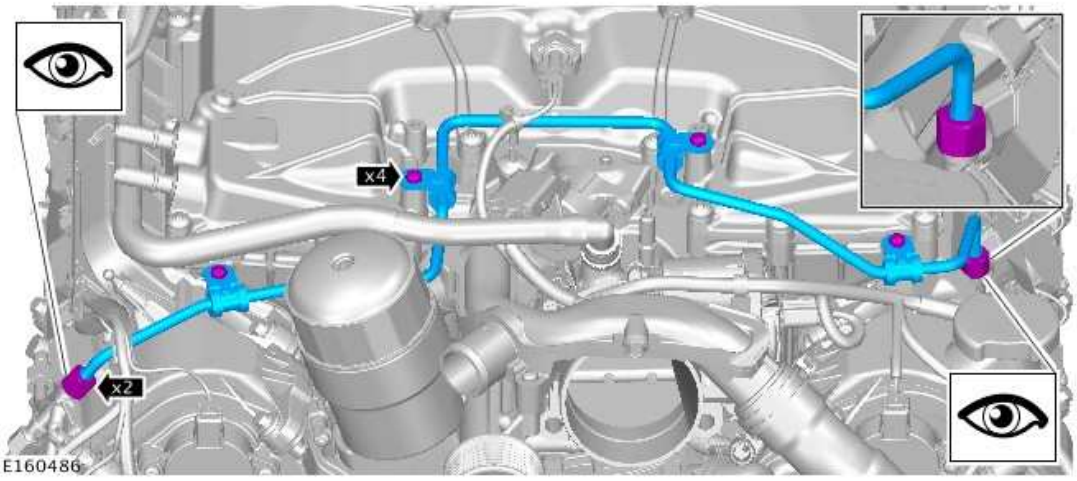
M5 nut **6 Nm**

37.

CAUTIONS:

- This fuel pipe can be re-used, inspect for signs of damage. Renew if necessary.
- Make sure that all openings are sealed. Use new blanking caps.

cardiagn.com

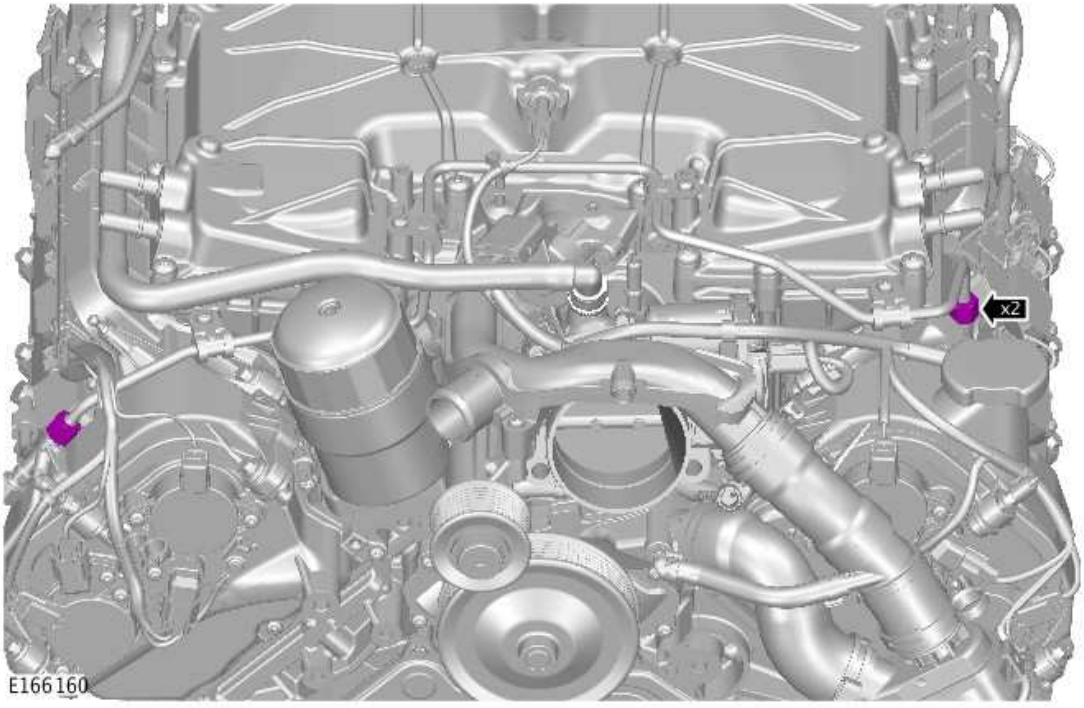


Torque:

Unions **21 Nm**

M6 **8 Nm**

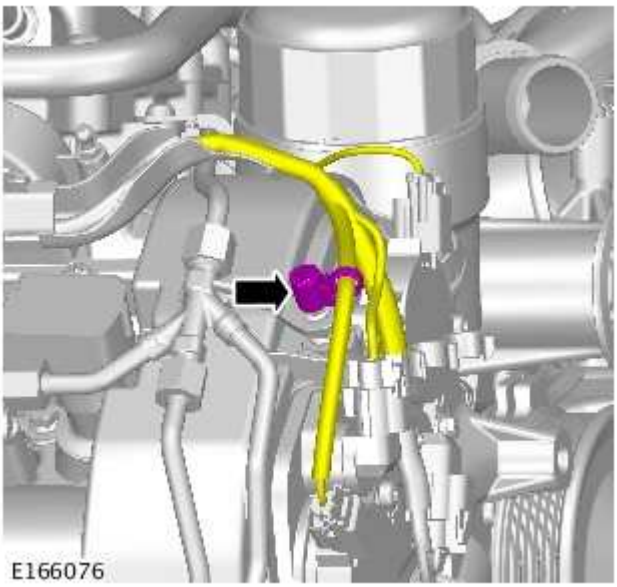
38.



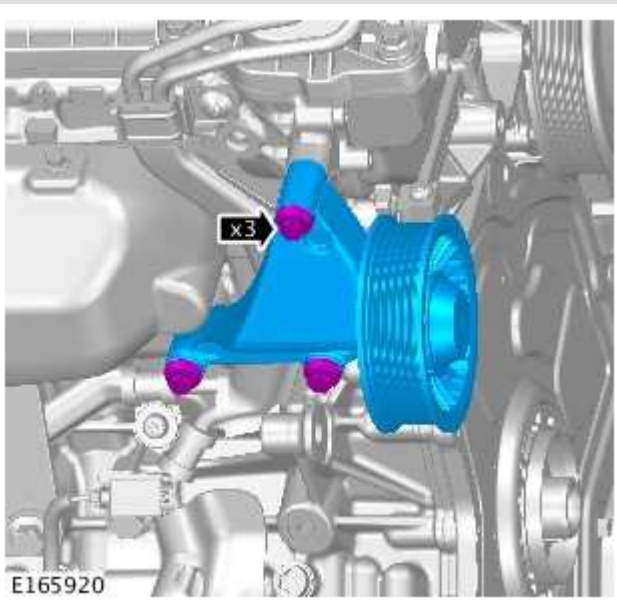
Torque: **21 Nm**

cardiagn.com

39.



40.



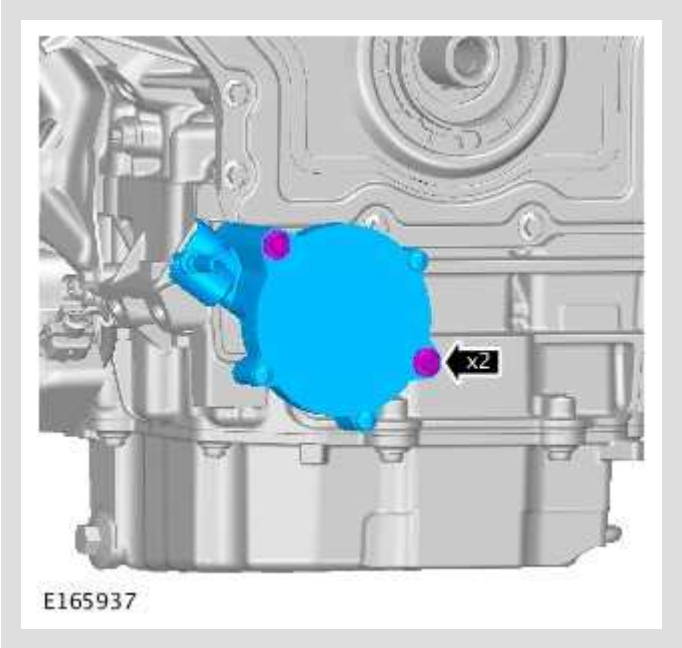
Torque: **25 Nm**

41.

NOTE:

Lubricate the seal with clean engine oil.

cardiagn.com



Torque: **12 Nm**

42.

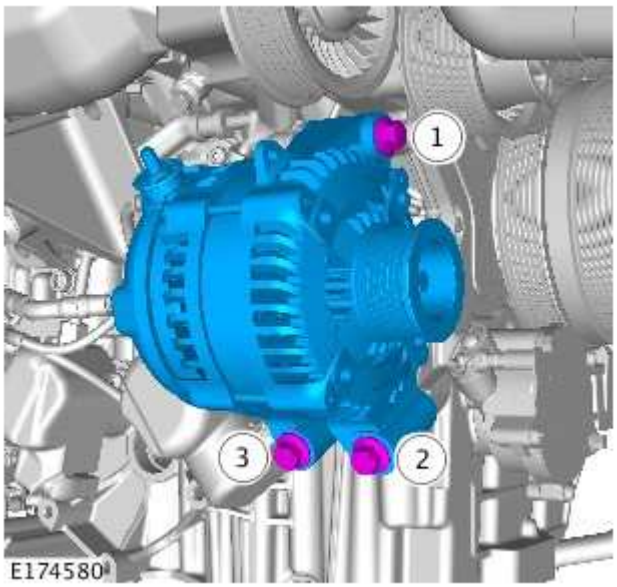
CAUTION:

Install all the bolts finger tight before final tightening.

NOTE:

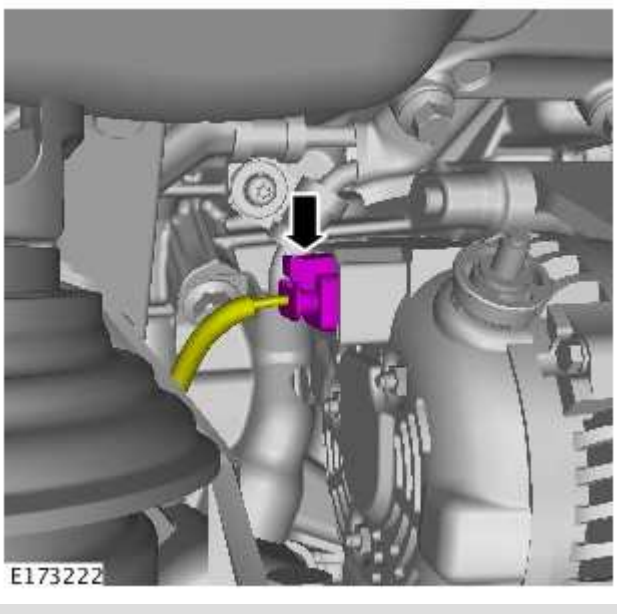
Tighten the bolts in the indicated sequence.

cardiagn.com



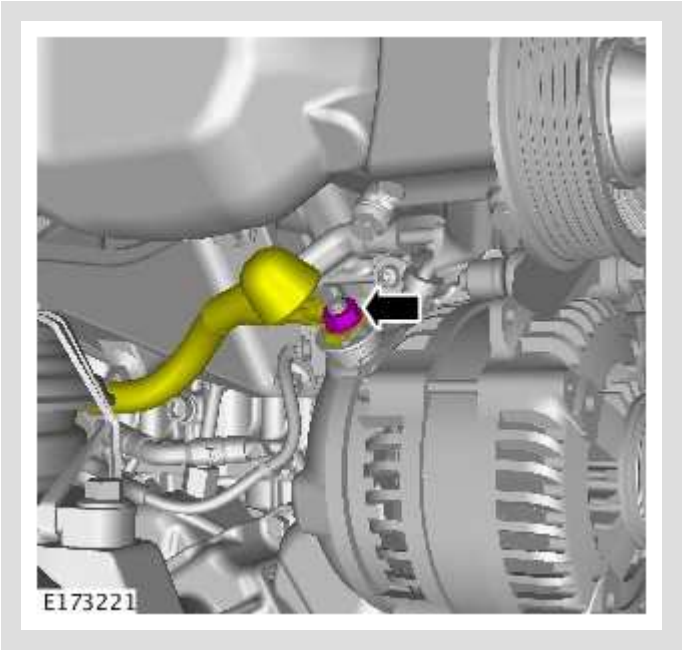
Torque: **48 Nm**

43.



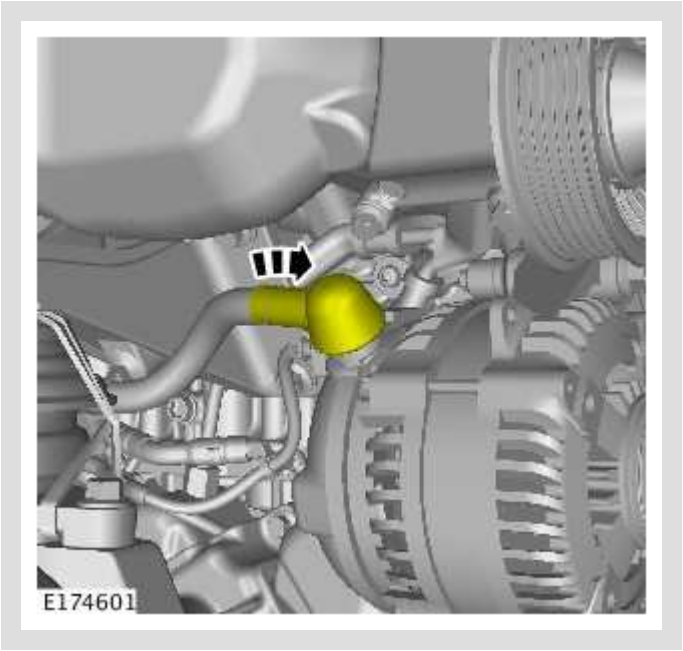
cardiagn.com

44.



Torque: **12 Nm**

45.



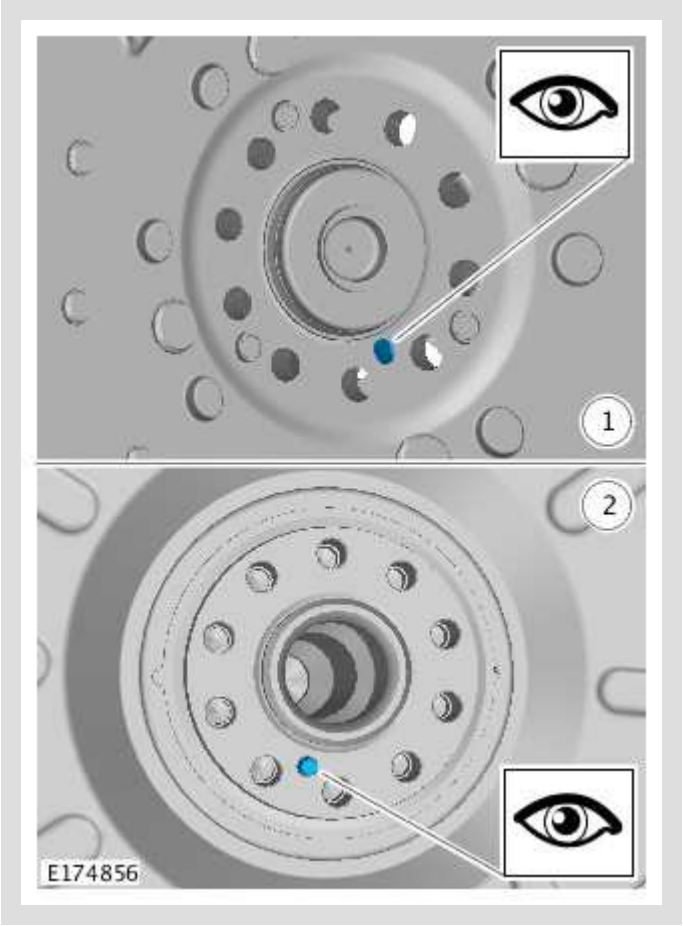
Vehicles with manual transmission

46.

NOTE:

Make sure the crankshaft and flywheel mating faces are clean before installation.

cardiagn.com



Make sure that the flywheel (1) is aligned with the crankshaft dowel (2).

47.

CAUTION:

Make sure that the component is correctly located on the dowel.

cardiagn.com

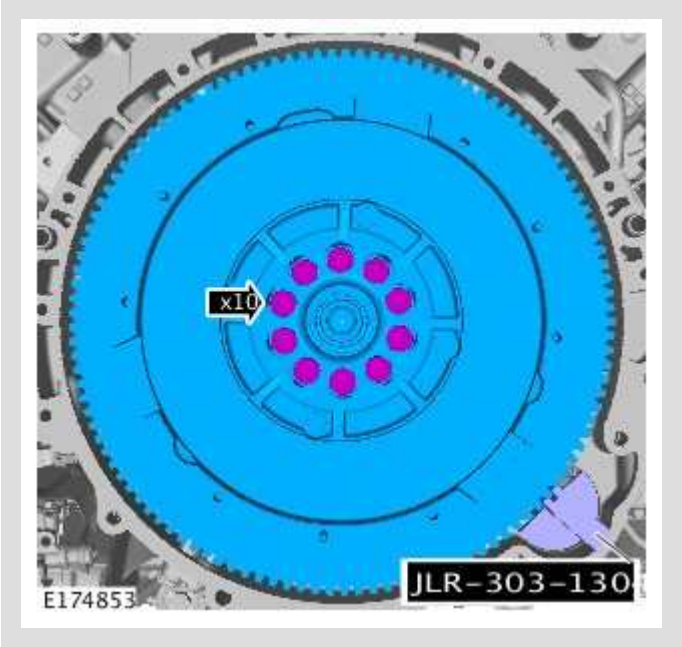
Special Tool(s): JLR-303-1304

48.

CAUTIONS:

- Make sure that new bolts are installed.
- Only tighten the bolts finger tight at this stage.

cardiagn.com



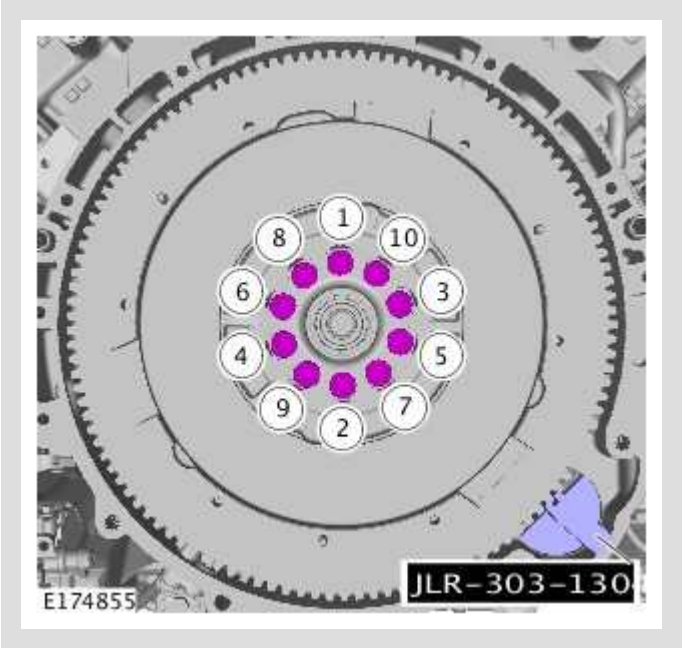
Special Tool(s): JLR-303-1304

49.

CAUTION:

Tighten the bolts in the sequence shown.

cardiagn.com



Special Tool(s): JLR-303-1304

Torque:

Stage 1: **30 Nm**

Stage 2: **120°**

Vehicles with automatic transmission

50.

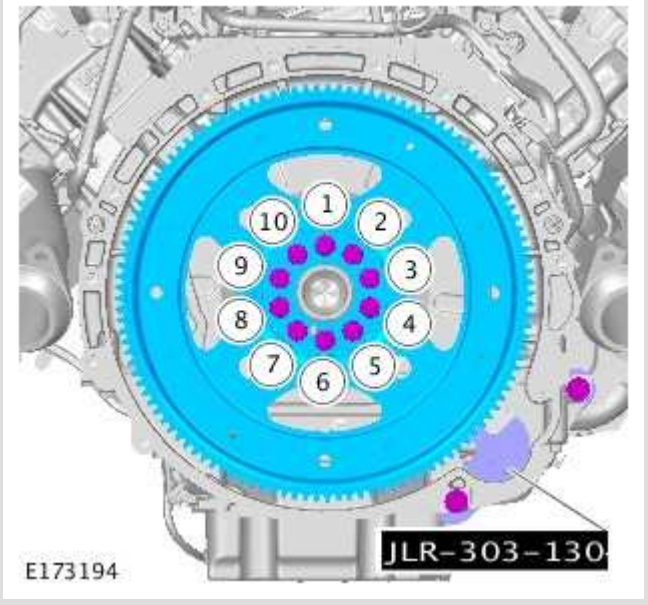
CAUTIONS:

- Install all the bolts finger tight before final tightening.
- The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
- Tighten the bolts in the sequence shown.

cardiagn.com

NOTES:

- Make sure that the crankshaft is not rotated.
- Make sure the crankshaft and flexplate mating faces are clean before installation.



Install the special tool.

Special Tool(s): JLR-303-1304

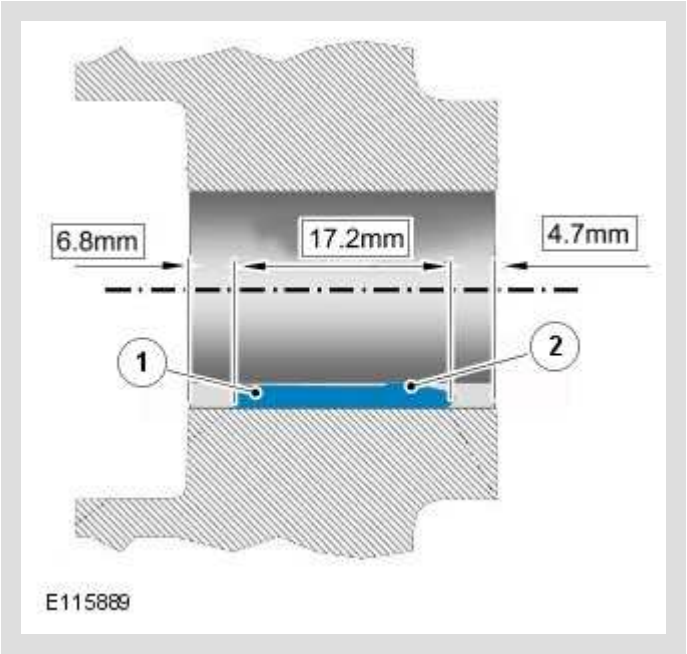
Torque:

Stage 1: **45 Nm**

Stage 2: **90°**

All vehicles

cardiagn.com



1. Apply RTV sealant to the crankshaft pulley keyway.
1. Make sure that the RTV sealant is applied in a 2mm diameter bead.
1. Make sure that when the RTV sealant is applied that the RTV sealant is level with the top of the keyway.

52.

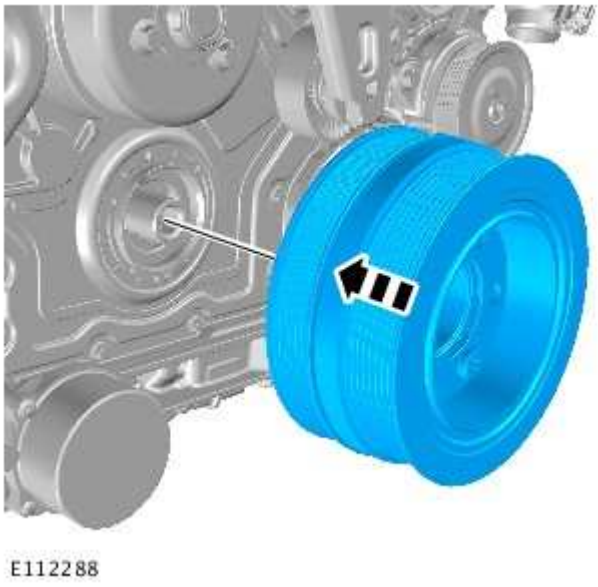
CAUTION:

Install a new friction washer before installing the crankshaft pulley.

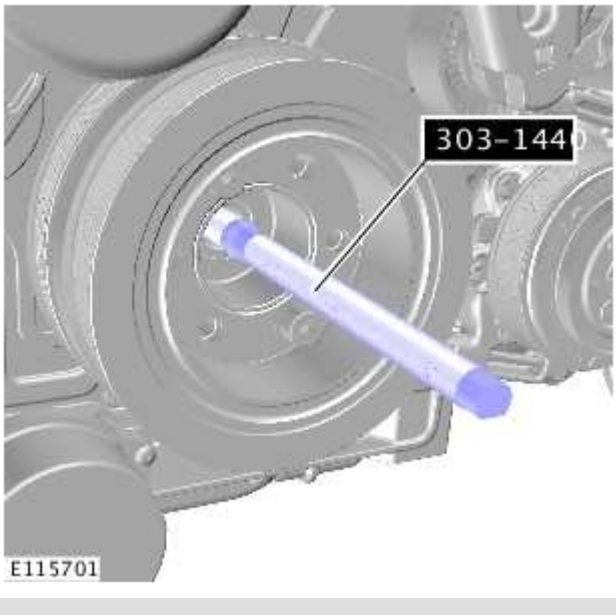
cardiagn.com

NOTE:

Make sure to clean the threads in the end of the crankshaft and that the crank nose is free of any foreign materials.



53.

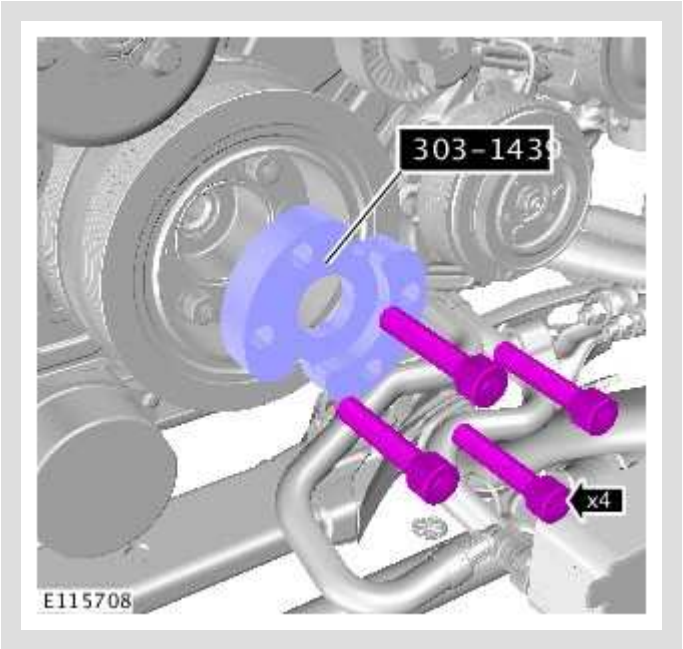


Install the special tool.

Special Tool(s): 303-1440

54.

cardiagn.com

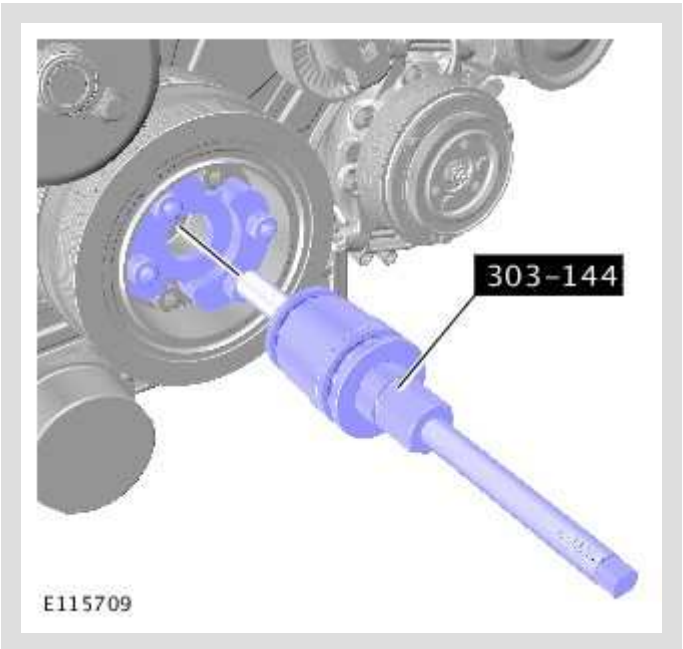


Install the special tool.

Special Tool(s): 303-1439

Torque: **25 Nm**

55.



Install the special tool.

Special Tool(s): 303-1441

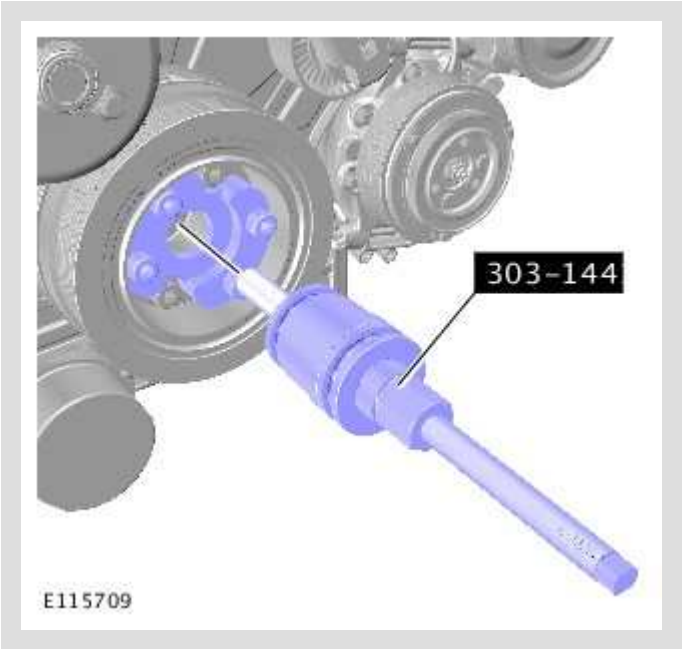
56.

CAUTION:

cardiagn.com

Rotate the crankshaft pulley installation tool until the pulley is fully located, do not over tighten. Failure to do this may result in damage to the components.

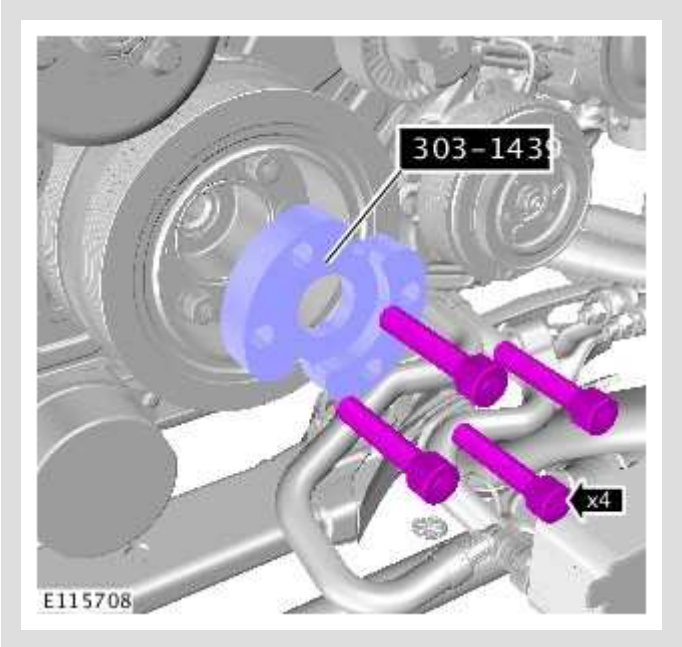
57.



Remove the special tool.
Special Tool(s): 303-1441

58.

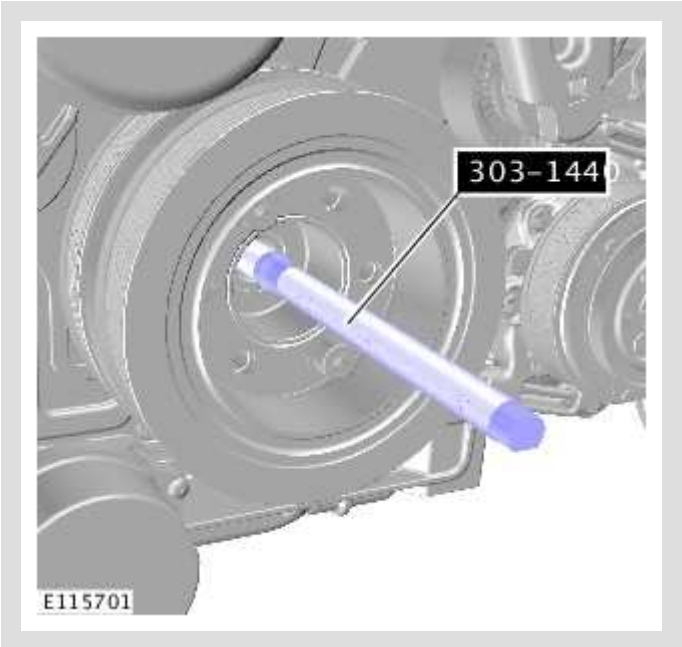
cardiagn.com



Remove the special tool.

Special Tool(s): 303-1439

59.



Remove the special tool.

Special Tool(s): 303-1440

60.

cardiagn.com

Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

61.

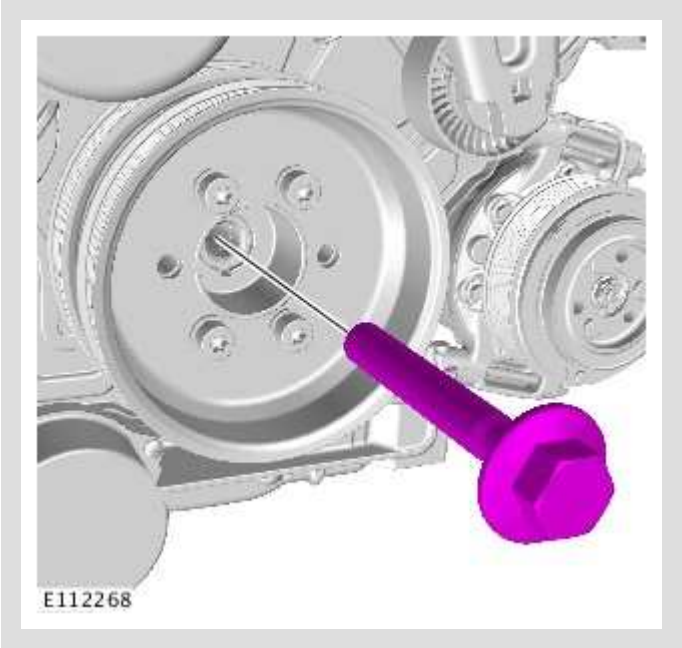
WARNING:

Make sure that a new bolt is installed.

CAUTION:

Tighten the component finger tight first.

cardiagn.com



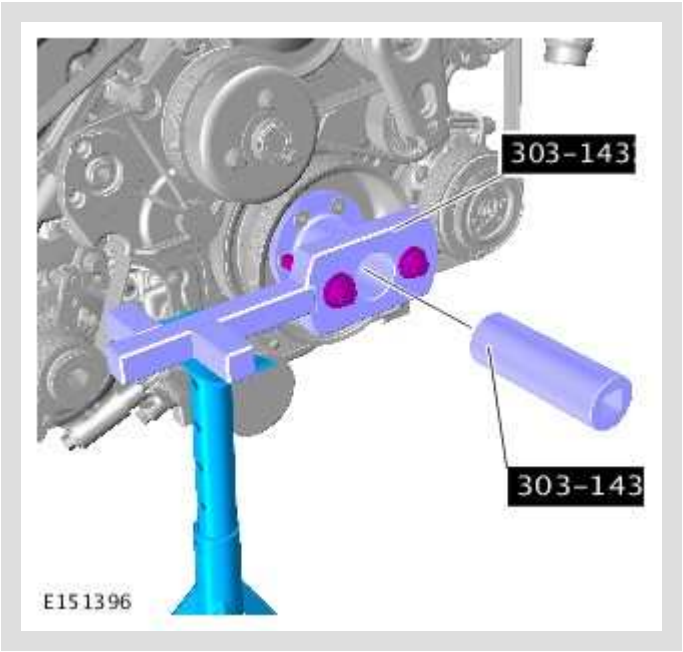
Install the crankshaft pulley bolt.

62.

NOTE:

The graphic shows the step for LH thread only, RH thread will be the opposite.

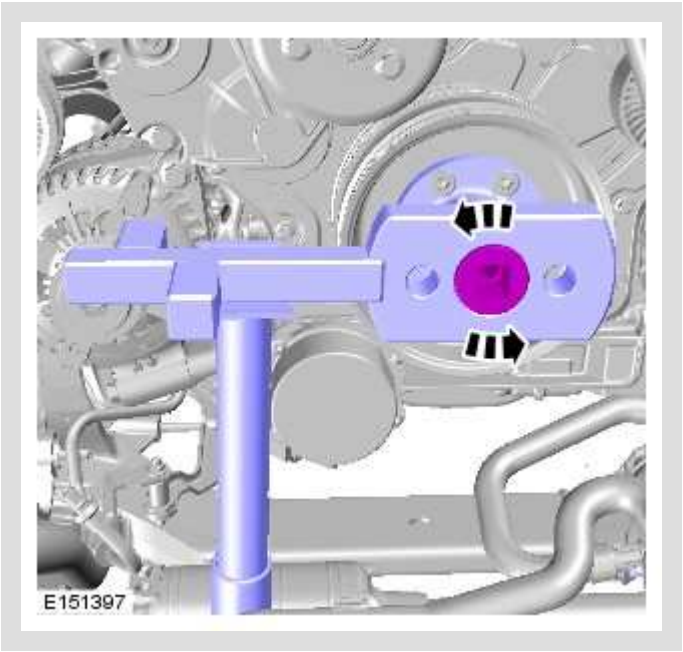
cardiagn.com



Special Tool(s): 303-1438 , 303-1437

Torque: **25 Nm**

63.



Special Tool(s): 303-1438 , 303-1437

cardiagn.com

Torque: **200 Nm**

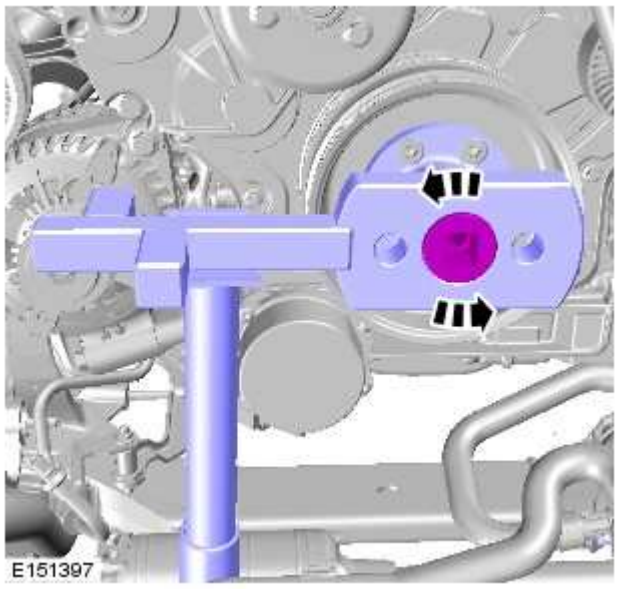
64.

CAUTION:

Make sure that the socket is turned through 270 degrees not the torque wrench.

NOTE:

The use of a torque multiplier capable of 600Nm will be required.

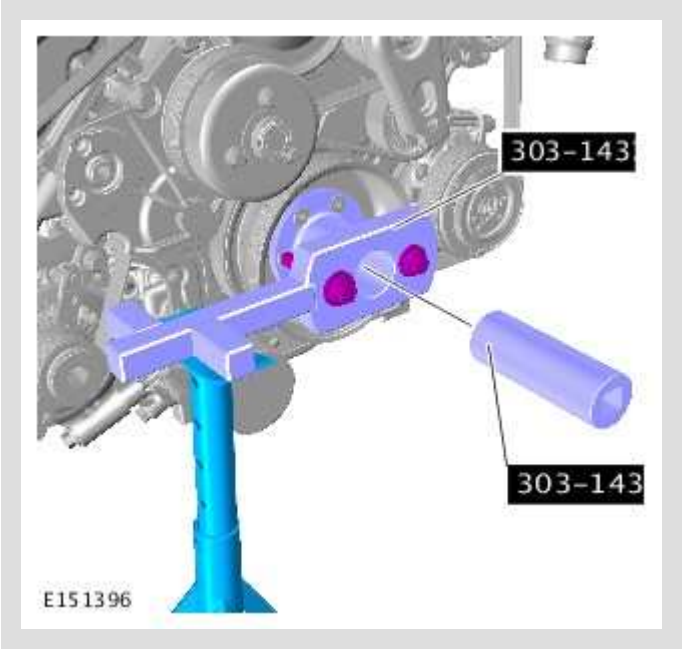


Special Tool(s): 303-1438 , 303-1437

Torque: **270°**

65.

cardiagn.com

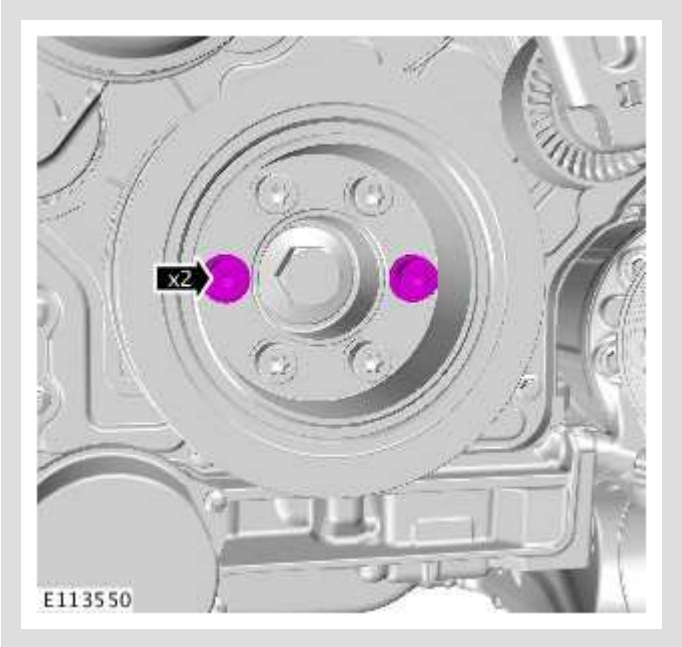


Remove the special tools.

Special Tool(s): 303-1438 , 303-1437

66.

cardiagn.com

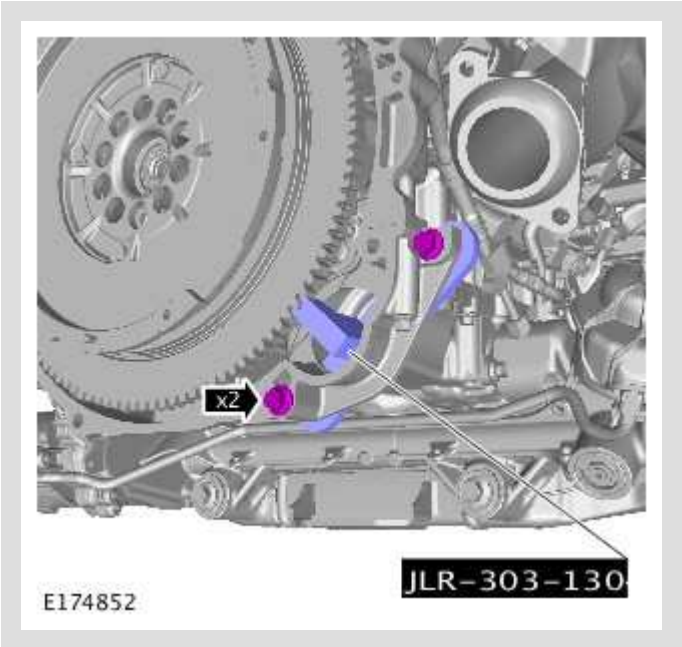


Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

Vehicles with manual transmission

67.



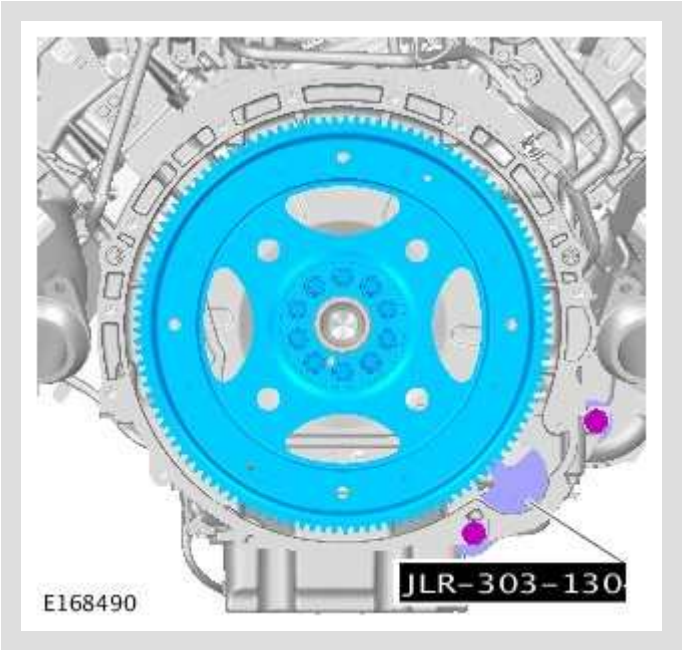
Remove the special tool.

Special Tool(s): JLR-303-1304

Vehicles with automatic transmission

68.

cardiagn.com

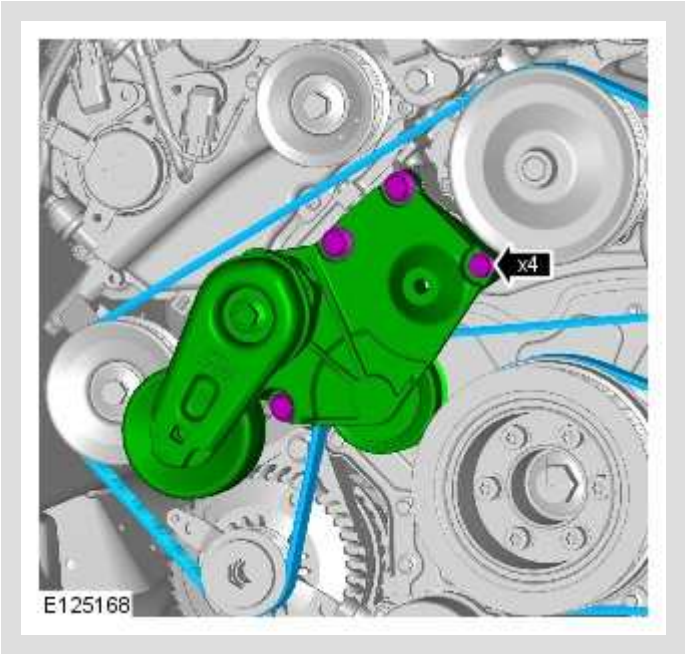


Remove the special tool.

Special Tool(s): JLR-303-1304

All vehicles

69.



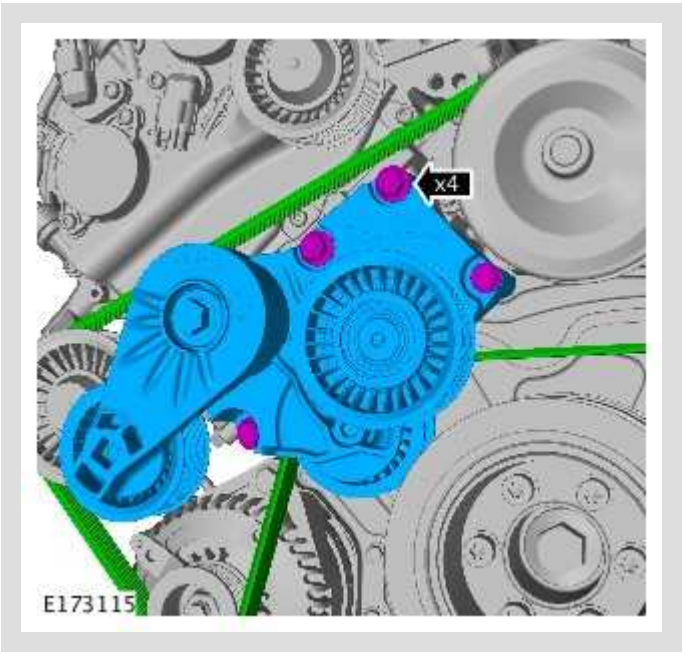
Torque: **25 Nm**

70.

NOTE:

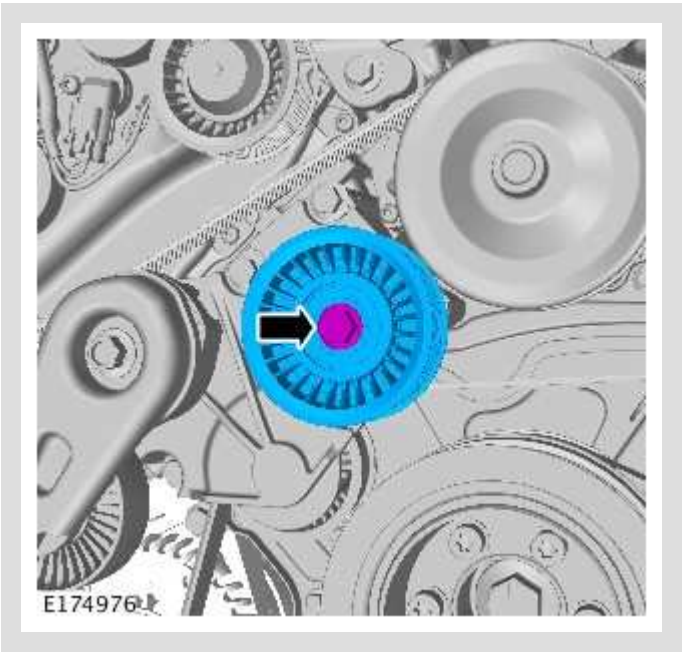
cardiagn.com

If equipped.



Torque: **25 Nm**

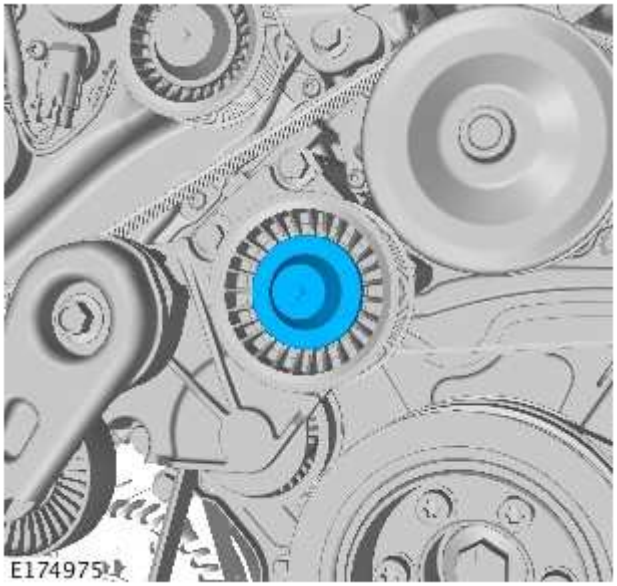
71.



Torque: **48 Nm**

72.

cardiagn.com



73.

NOTE:

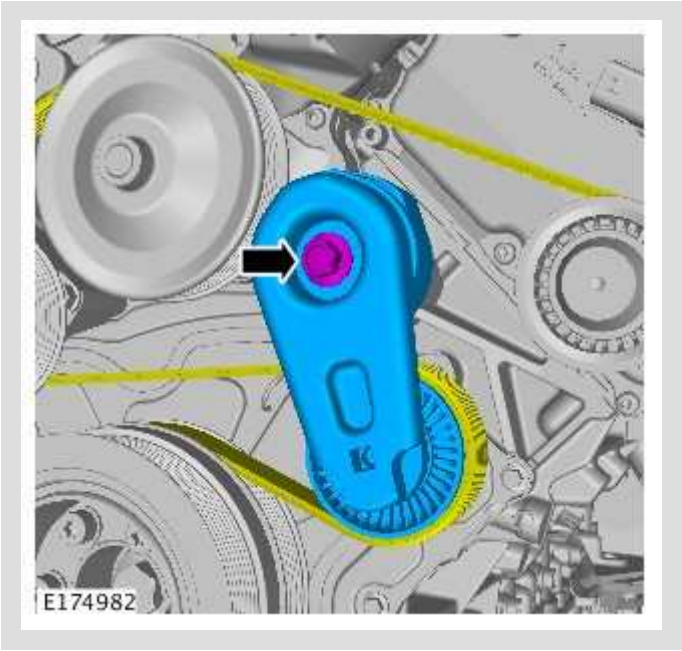
If equipped.

cardiagn.com

Torque: **48 Nm**

74.

cardiagn.com



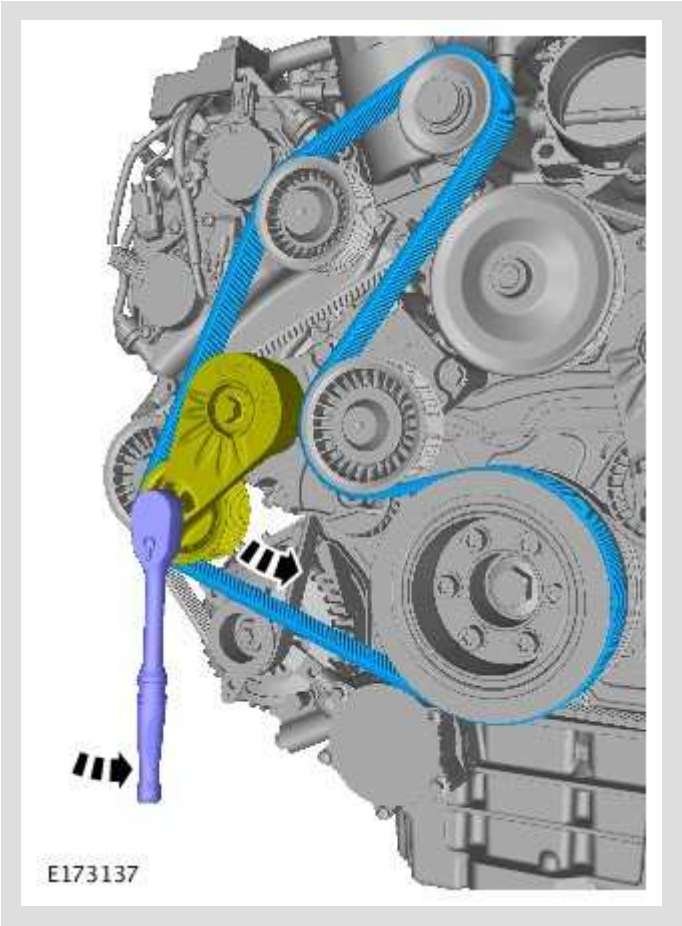
Torque: **48 Nm**

75.

NOTE:

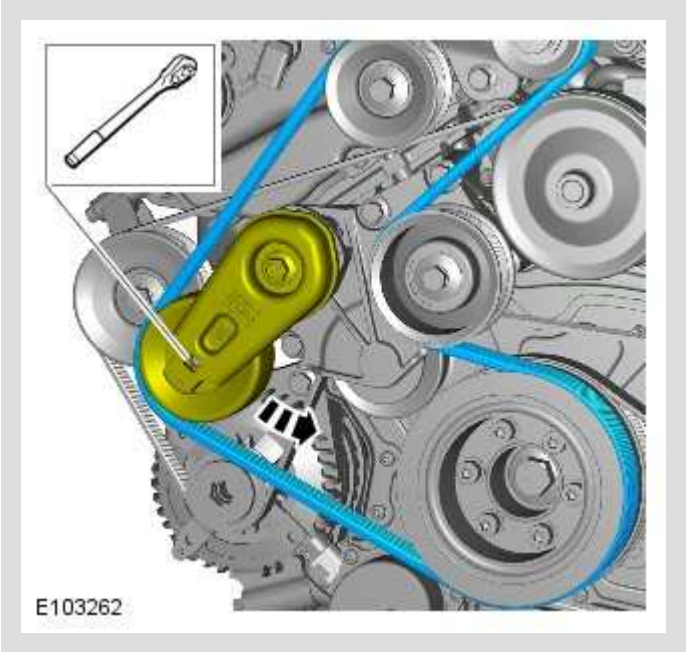
If equipped.

cardiagn.com



76.

cardiagn.com



77. Refer to: Engine (303-01A Engine - V6 S/C 3.0L Petrol, Installation).

78. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

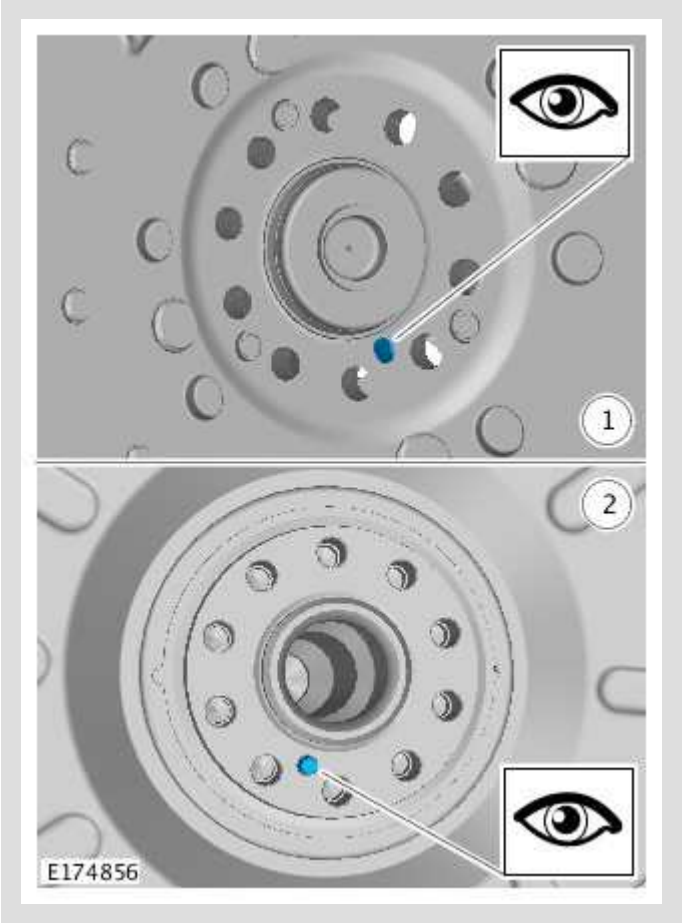
79. Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

Vehicles with manual transmission

1. **NOTE:**

Make sure the crankshaft and flywheel mating faces are clean before installation.

cardiagn.com



Make sure that the flywheel (1) is aligned with the crankshaft dowel (2).

2.

CAUTION:

Make sure that the component is correctly located on the dowel.

cardiagn.com

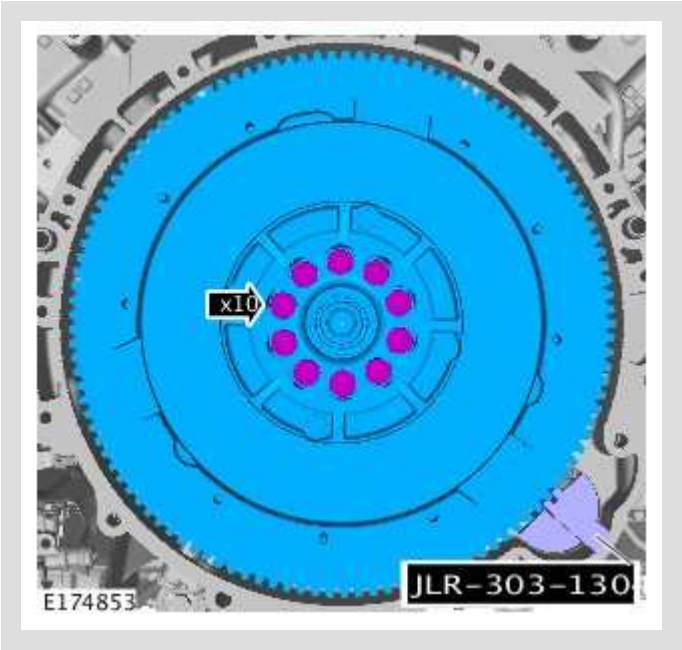
Special Tool(s): JLR-303-1304

3.

CAUTIONS:

- Make sure that new bolts are installed.
- Only tighten the bolts finger tight at this stage.

cardiagn.com



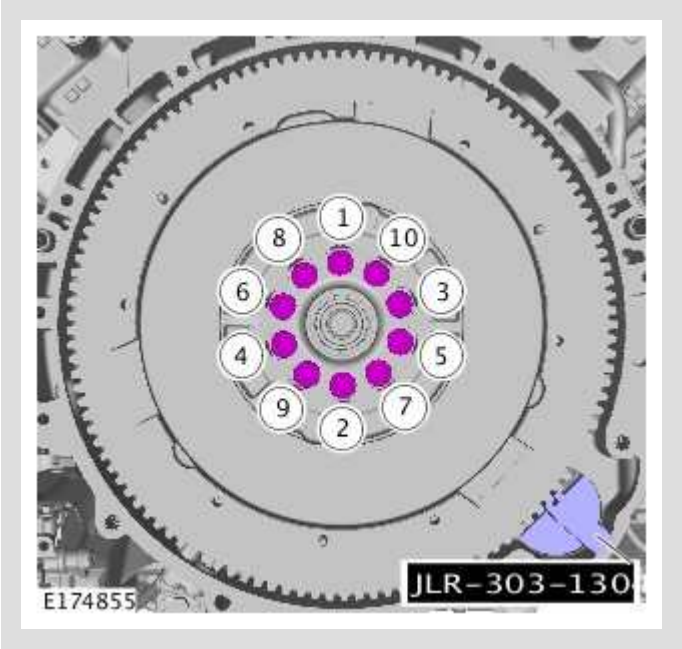
Special Tool(s): JLR-303-1304

4.

CAUTION:

Tighten the bolts in the sequence shown.

cardiagn.com



Special Tool(s): JLR-303-1304

Torque:

Stage 1: **30 Nm**

Stage 2: **120°**

Vehicles with automatic transmission

1.

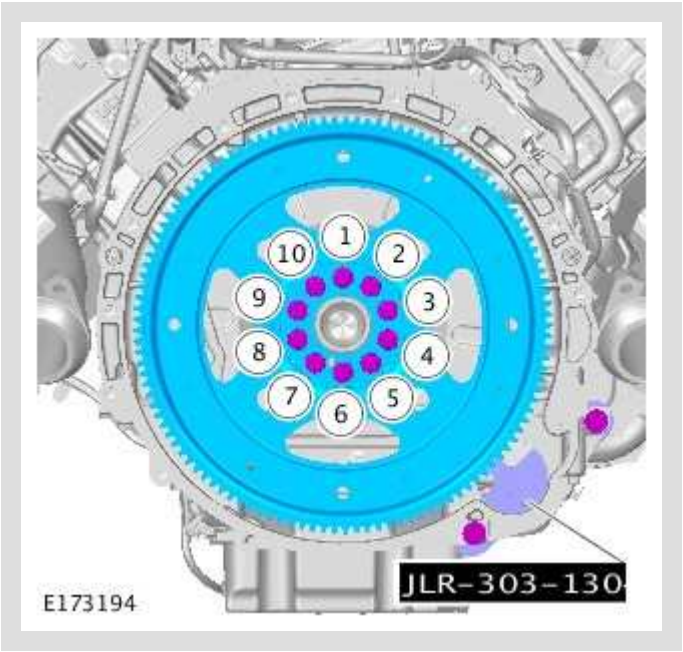
CAUTIONS:

- Install all the bolts finger tight before final tightening.
- The bolts can only be used 3 times, mark the bolts with a center punch. If 2 punch marks are visible, discard the bolts.
- Tighten the bolts in the sequence shown.

NOTES:

cardiagn.com

- Make sure that the crankshaft is not rotated.
- Make sure the crankshaft and flexplate mating faces are clean before installation.



Install the special tool.

Special Tool(s): JLR-303-1304

Torque:

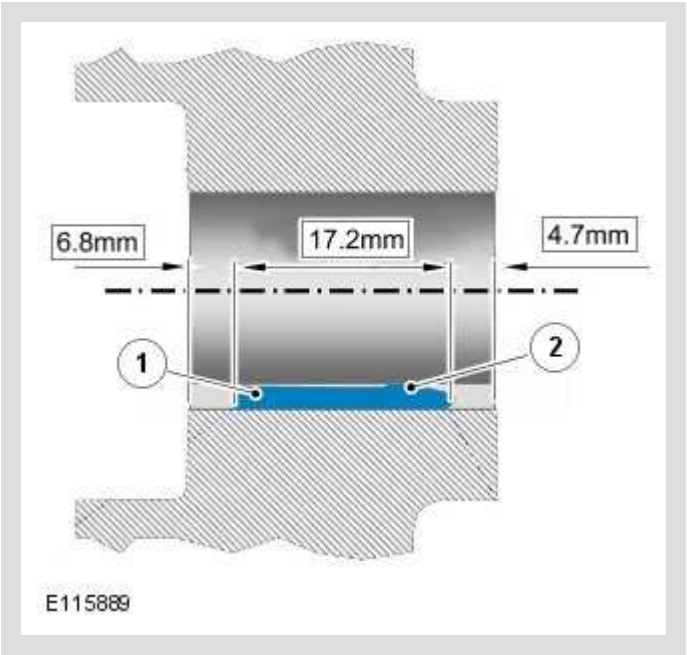
Stage 1: **45 Nm**

Stage 2: **90°**

All vehicles

1.

cardiagn.com



1. Apply RTV sealant to the crankshaft pulley keyway.
1. Make sure that the RTV sealant is applied in a 2mm diameter bead.
1. Make sure that when the RTV sealant is applied that the RTV sealant is level with the top of the keyway.

2.

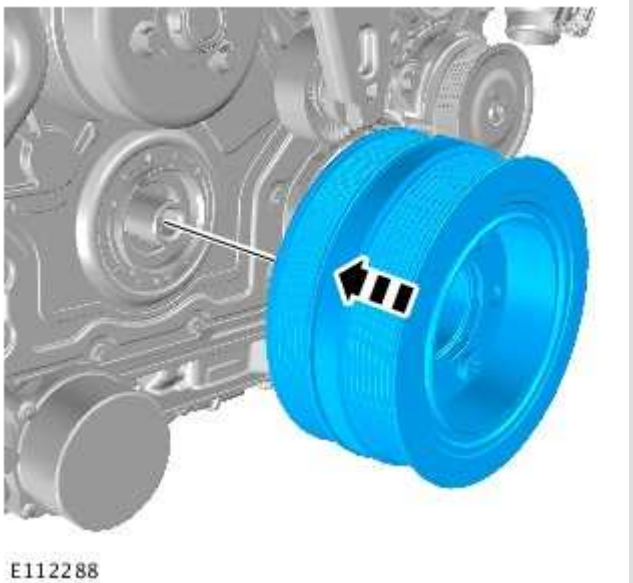
CAUTION:

Install a new friction washer before installing the crankshaft pulley.

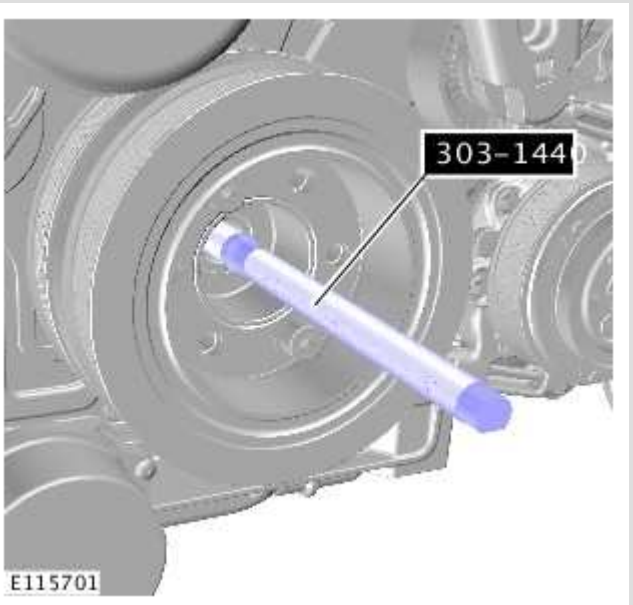
cardiagn.com

NOTE:

Make sure to clean the threads in the end of the crankshaft and that the crank nose is free of any foreign materials.



3.

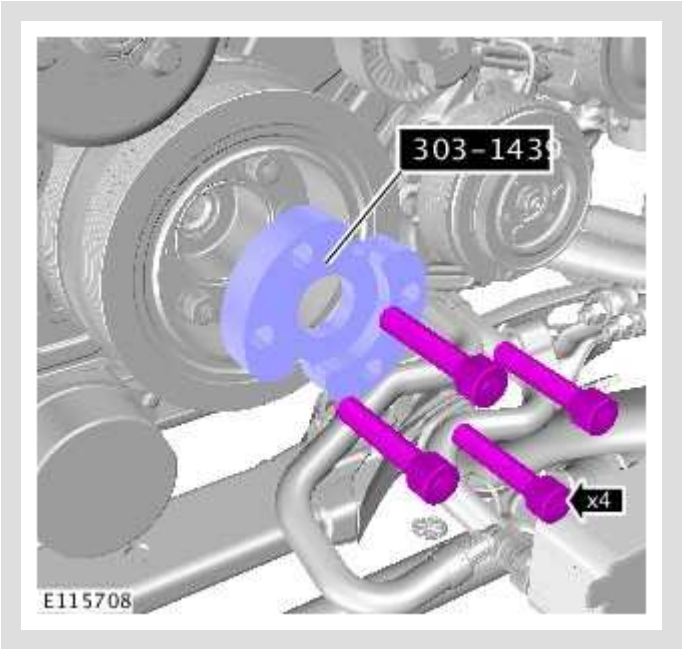


Install the special tool.

Special Tool(s): 303-1440

4.

cardiagn.com

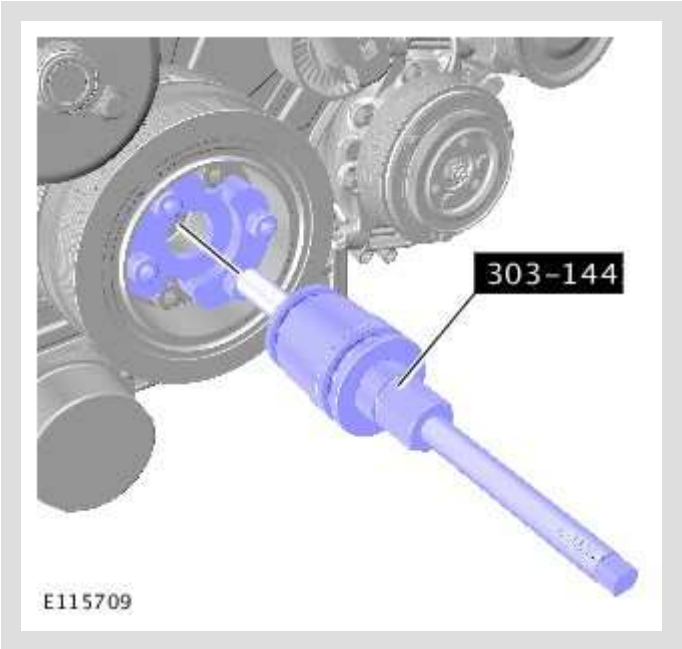


Install the special tool.

Special Tool(s): 303-1439

Torque: **25 Nm**

5.



Install the special tool.

Special Tool(s): 303-1441

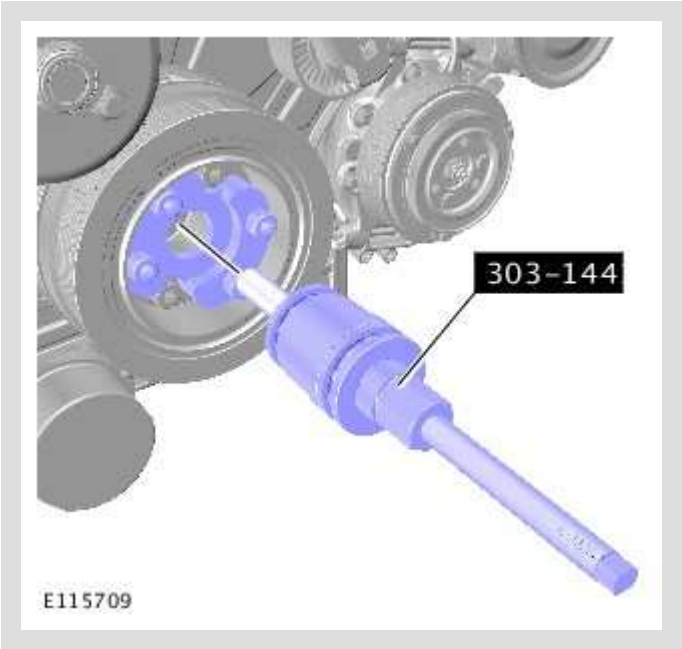
6.

CAUTION:

cardiagn.com

Rotate the crankshaft pulley installation tool until the pulley is fully located, do not over tighten. Failure to do this may result in damage to the components.

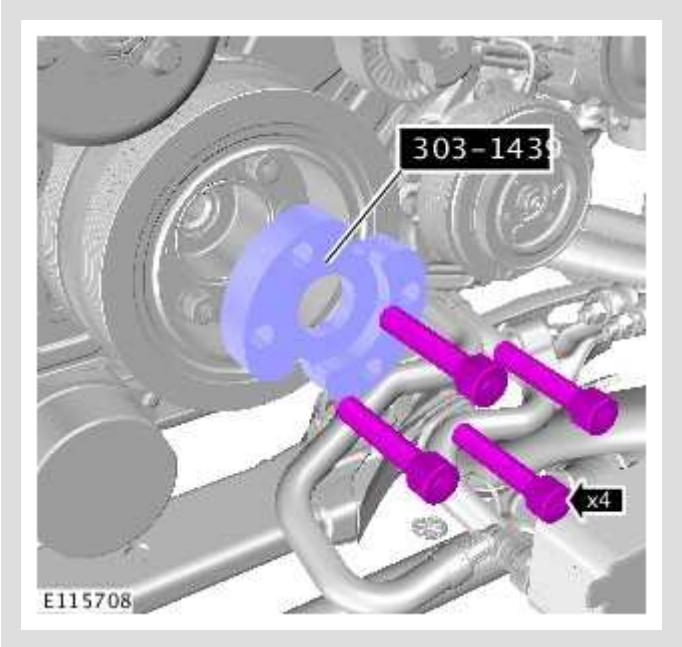
7.



Remove the special tool.
Special Tool(s): 303-1441

8.

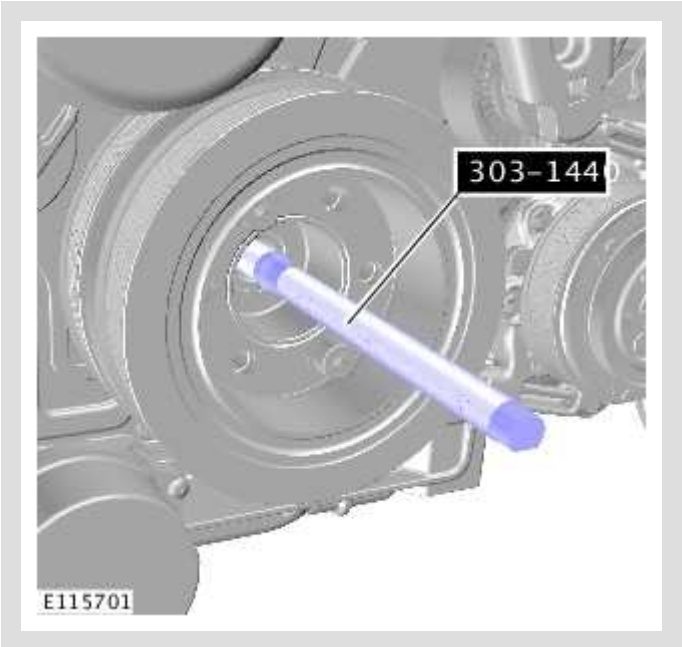
cardiagn.com



Remove the special tool.

Special Tool(s): 303-1439

9.



Remove the special tool.

Special Tool(s): 303-1440

10.

cardiagn.com

Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

11.

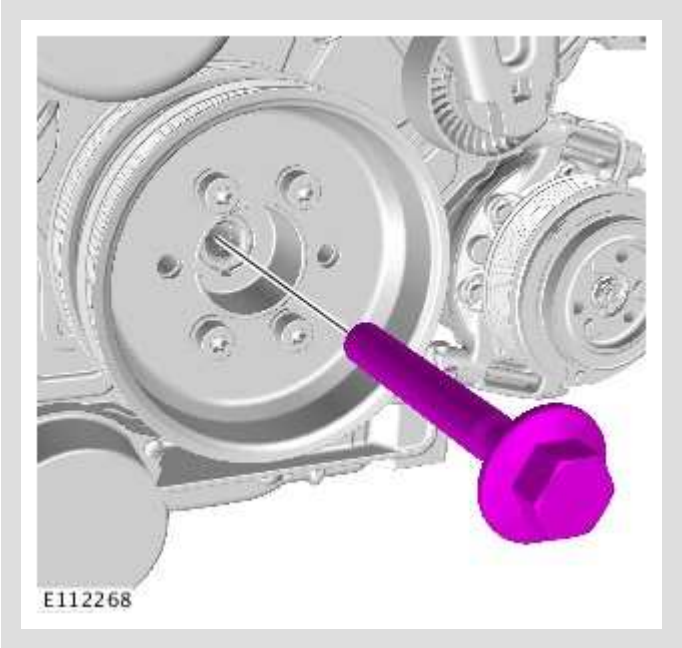
WARNING:

Make sure that a new bolt is installed.

CAUTION:

Tighten the component finger tight first.

cardiagn.com



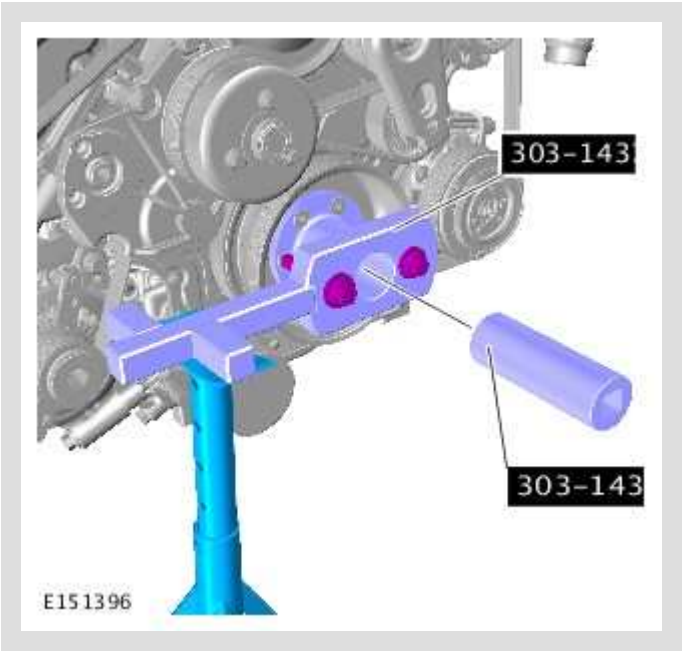
Install the crankshaft pulley bolt.

12.

NOTE:

The graphic shows the step for LH thread only, RH thread will be the opposite.

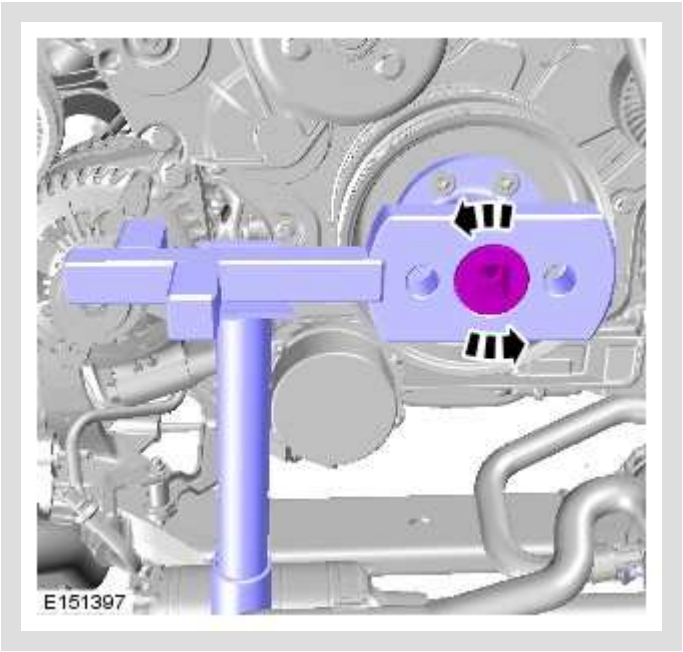
cardiagn.com



Special Tool(s): 303-1438 , 303-1437

Torque: **25 Nm**

13.



Special Tool(s): 303-1438 , 303-1437

cardiagn.com

Torque: **200 Nm**

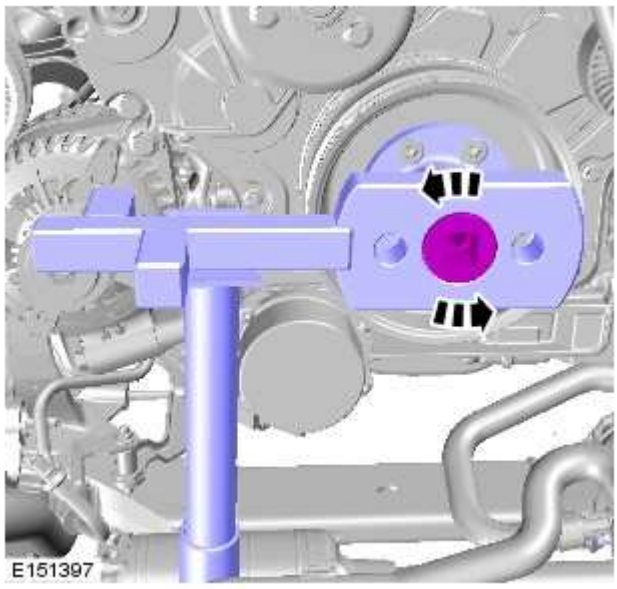
14.

CAUTION:

Make sure that the socket is turned through 270 degrees not the torque wrench.

NOTE:

The use of a torque multiplier capable of 600Nm will be required.

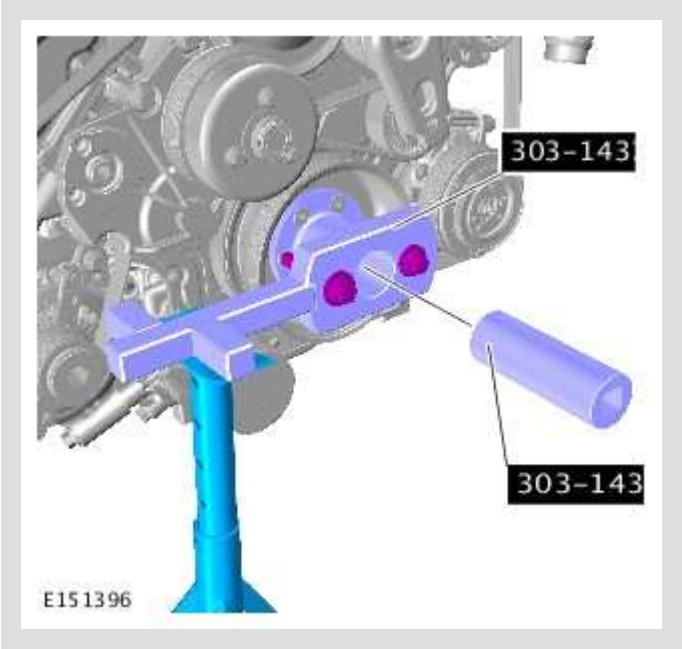


Special Tool(s): 303-1438 , 303-1437

Torque: **270°**

15.

cardiagn.com

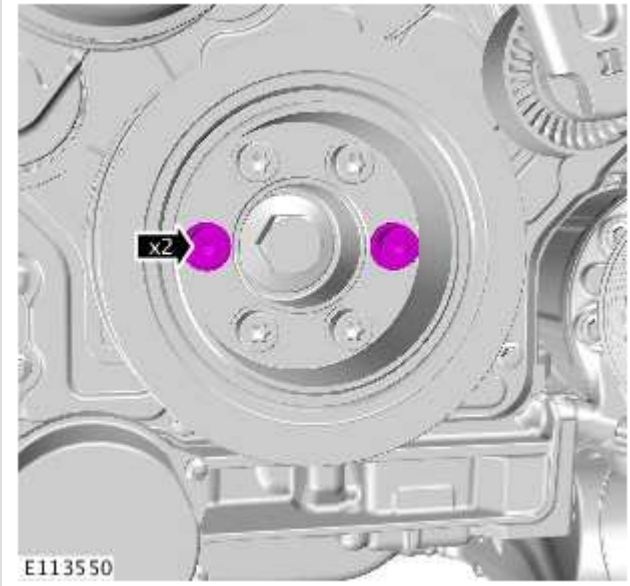


Remove the special tools.

Special Tool(s): 303-1438 , 303-1437

16.

cardiagn.com

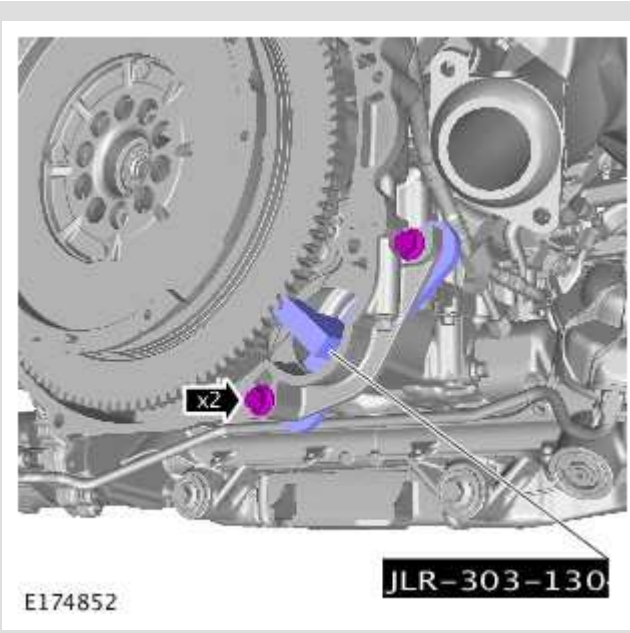


Apply loctite 270 to the thread of the bolts.

Torque: **65 Nm**

Vehicles with manual transmission

1.



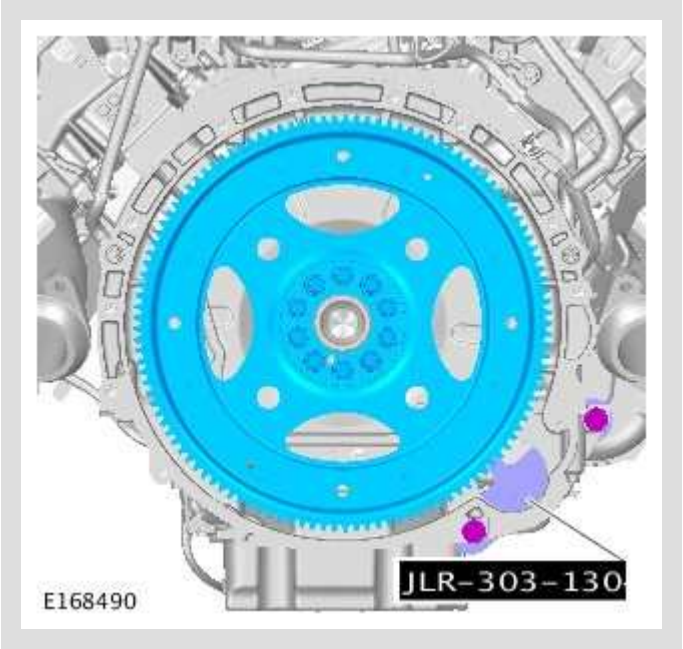
Remove the special tool.

Special Tool(s): JLR-303-1304

Vehicles with automatic transmission

cardiagn.com

1.

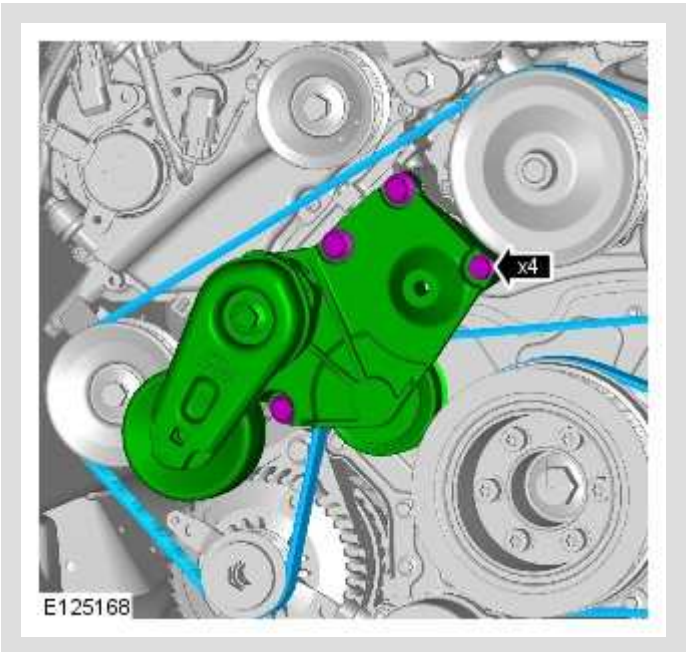


Remove the special tool.

Special Tool(s): JLR-303-1304

All vehicles

1.



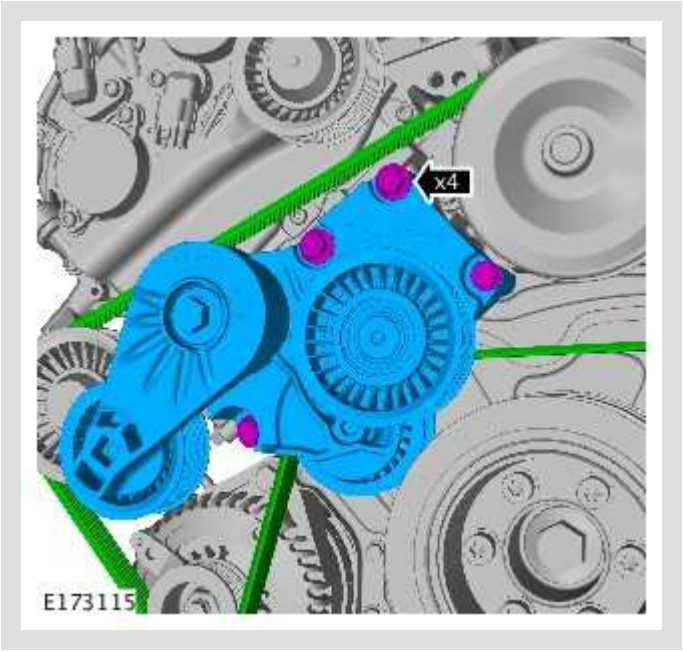
Torque: **25 Nm**

2.

NOTE:

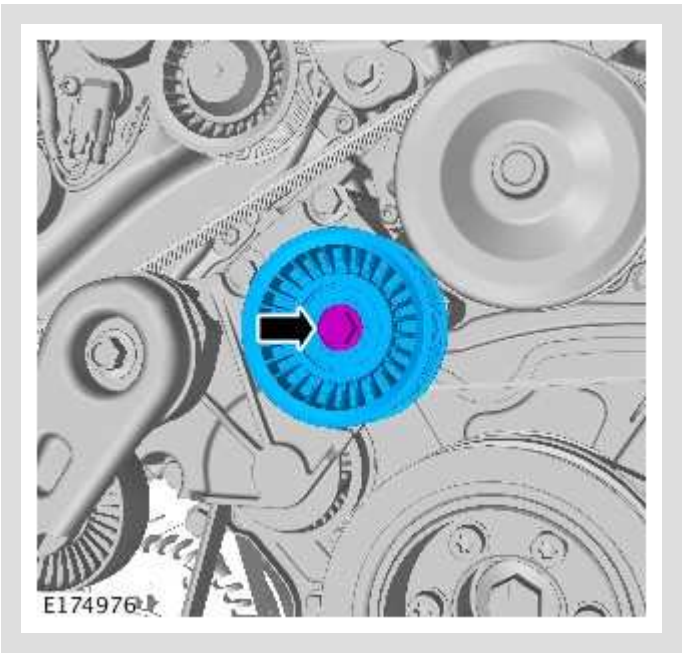
If equipped.

cardiagn.com



Torque: **25 Nm**

3.



Torque: **48 Nm**

4.

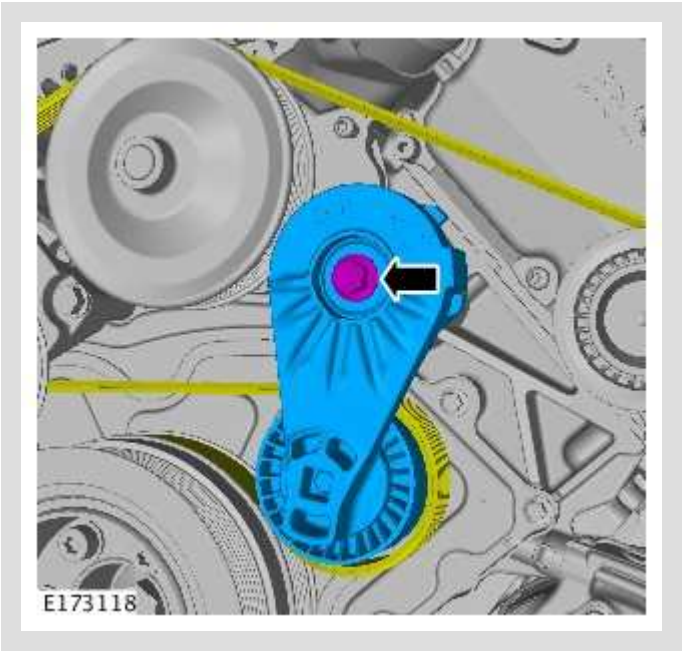
cardiagn.com

5.

NOTE:

If equipped.

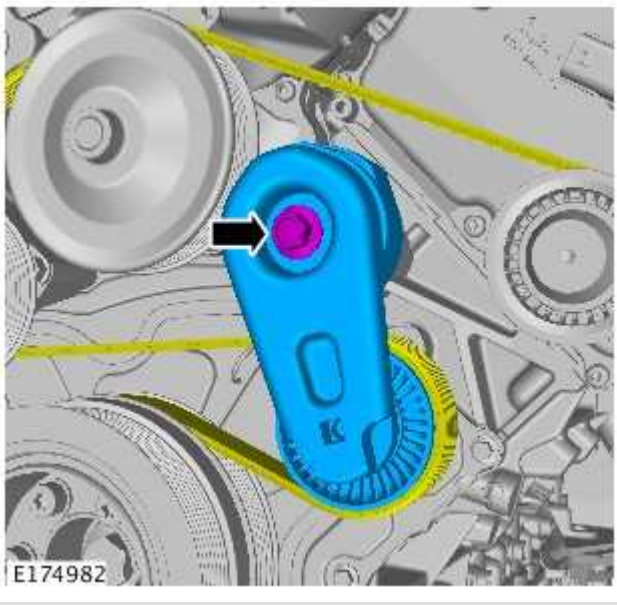
cardiagn.com



Torque: **48 Nm**

6.

cardiagn.com

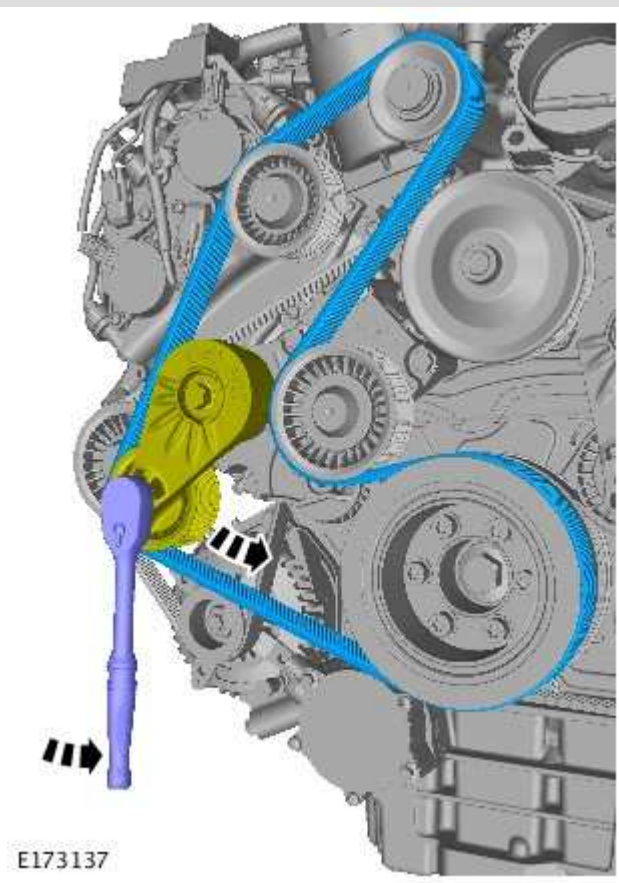


Torque: **48 Nm**

7.

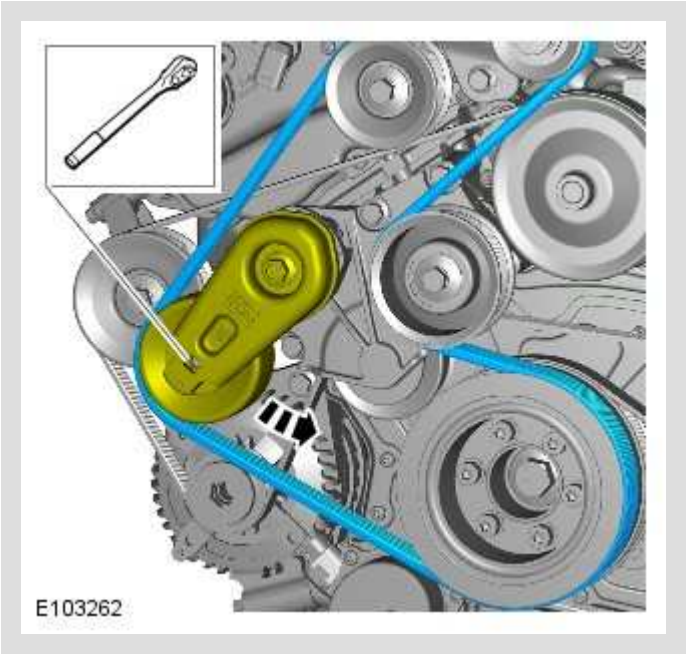
NOTE:

If equipped.



cardiagn.com

8.



9. Refer to: Engine (303-01A Engine - V6 S/C 3.0L Petrol, Installation).

10. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

11. Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

ENGINE (G1587022)

REMOVAL

REMOVAL

SPECIAL TOOL(S)

303-021

Engine support bracket

303-1435

Engine Lifting Brackets Rear

303-1436

Engine Lifting Bracket Front

cardiagn.com

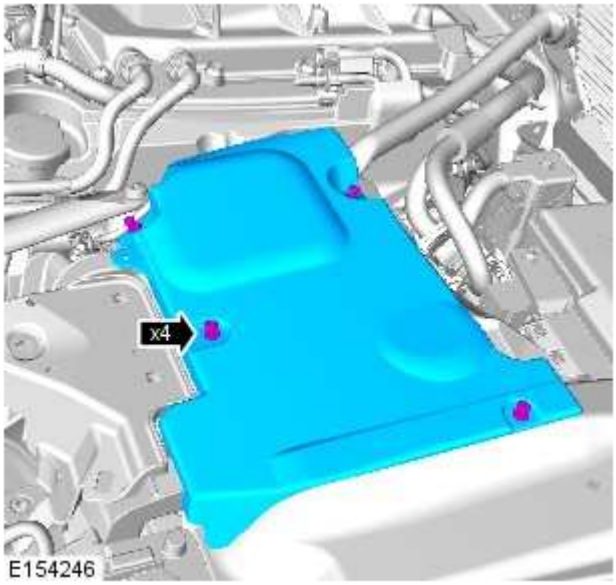
NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some components shown removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
2. Refer to: Cooling Fan Motor and Shroud (303-03C Engine Cooling - V8 S/C 5.0L Petrol, Removal and Installation).
3. Refer to: Air Cleaner Outlet Intermediate Pipe LH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).
4. Refer to: Air Cleaner Outlet Pipe RH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).
5. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).
6. Refer to: Cooling System Draining, Filling and Bleeding (303-03C Engine Cooling - V8 S/C 5.0L Petrol, General Procedures).
7. Refer to: Transmission (307-01B Automatic Transmission /Transaxle - V8 S/C 5.0L Petrol, Installation).
8. **NOTE:**

   The step must be carried out on both sides.

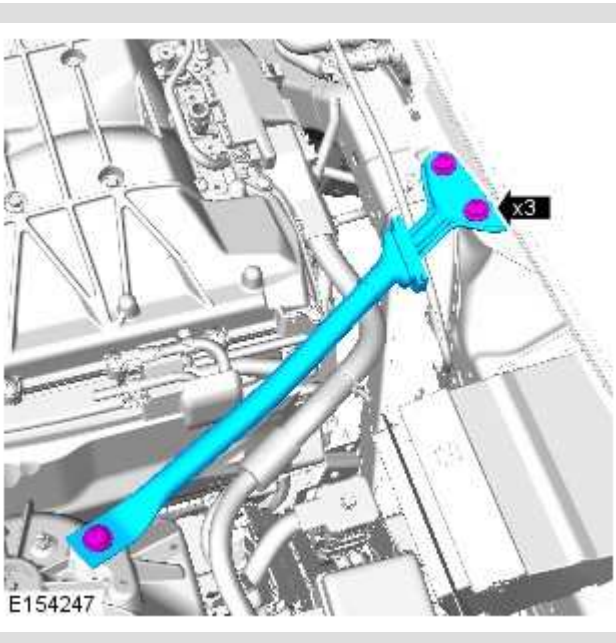
cardiagn.com



9.

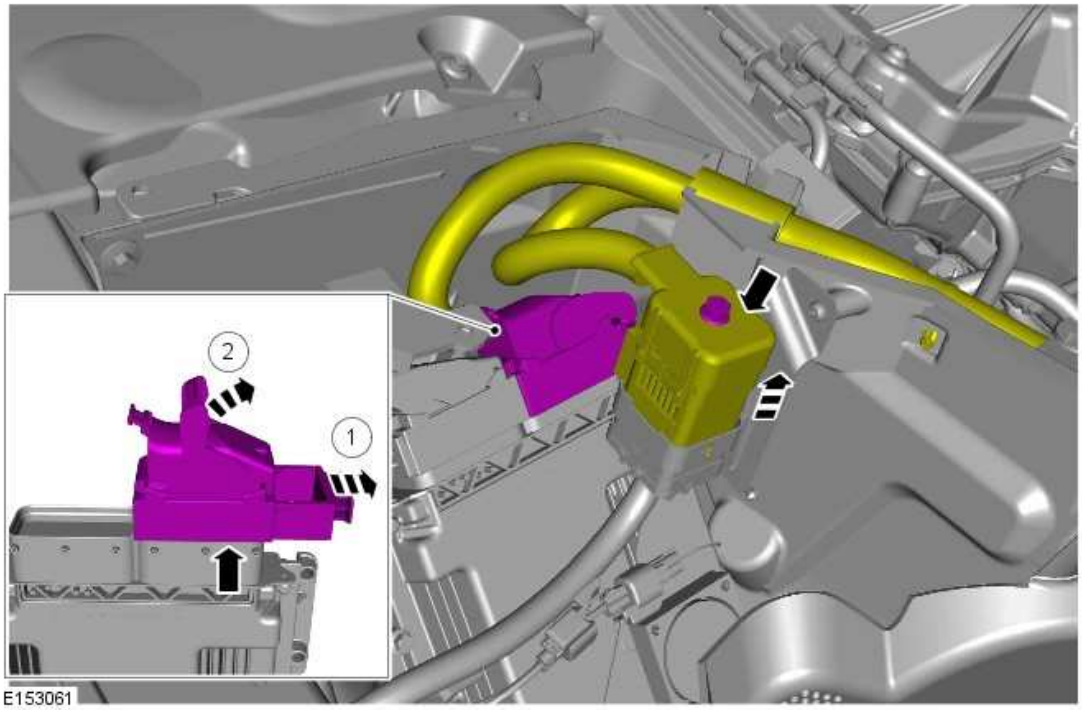
NOTE:

The step must be carried out on both sides.

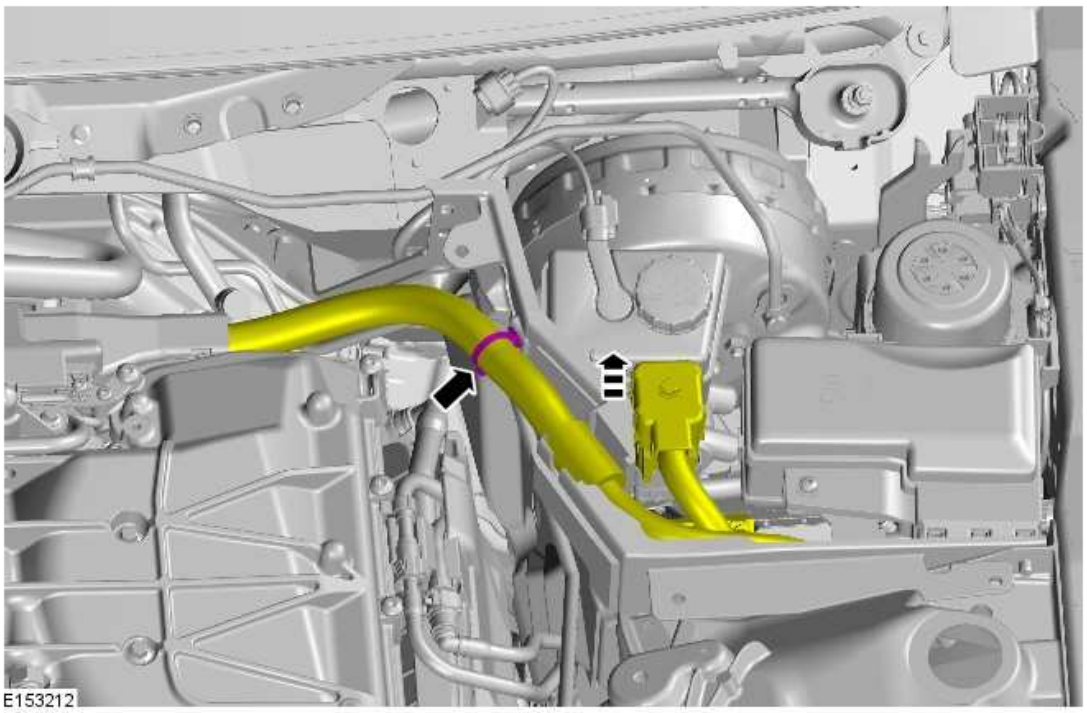


10.

cardiagn.com

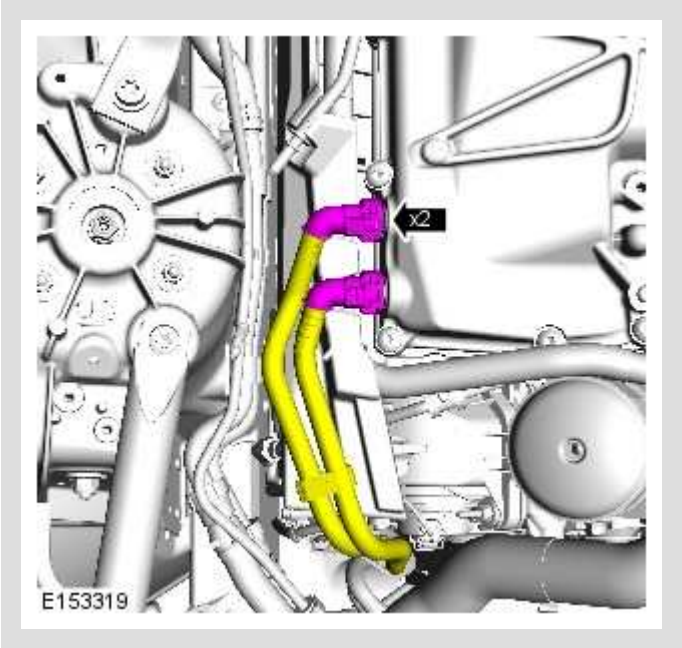


11.

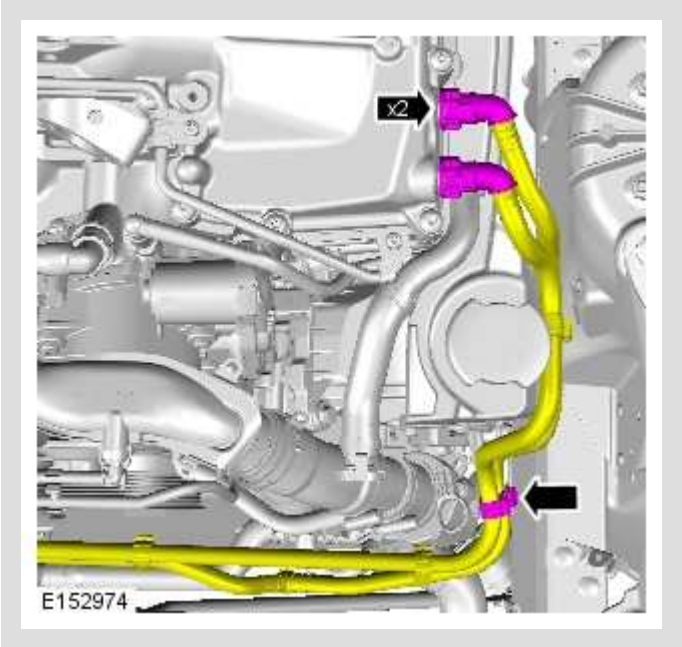


cardiagn.com

12.

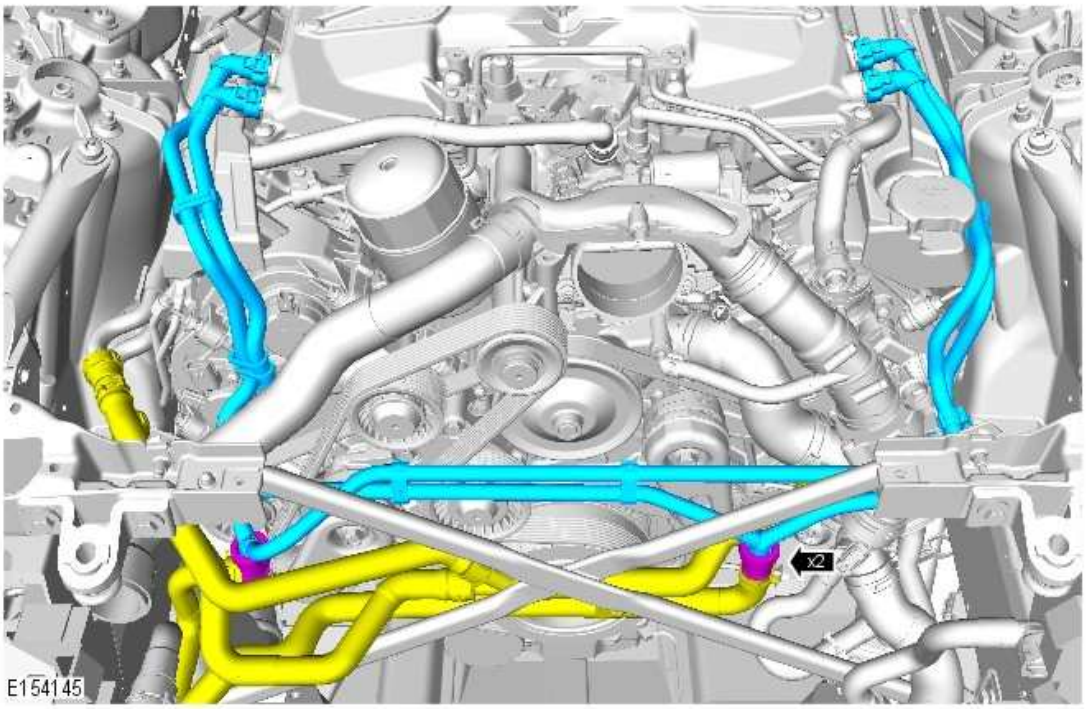


13.



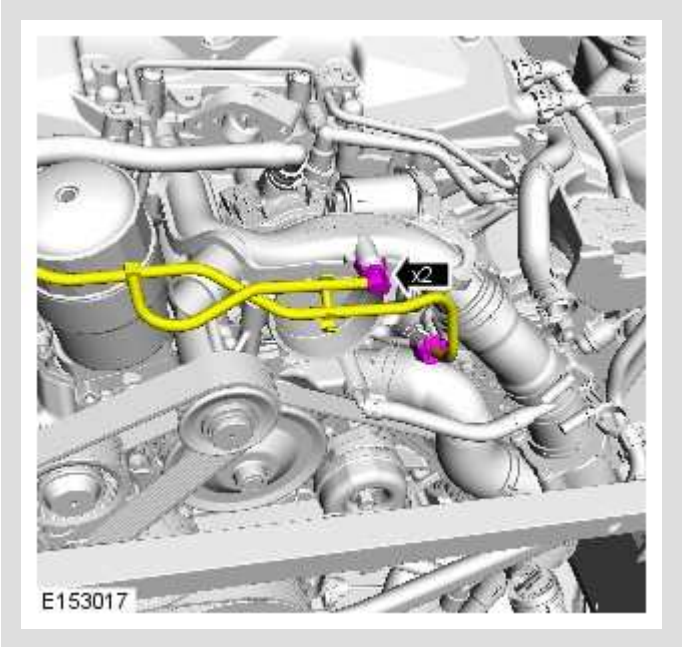
14.

cardiagn.com

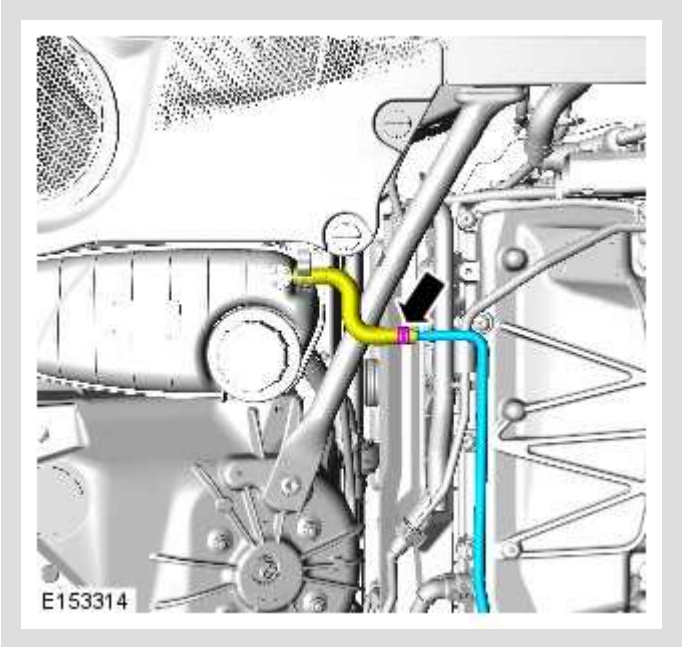


15.

cardiagn.com

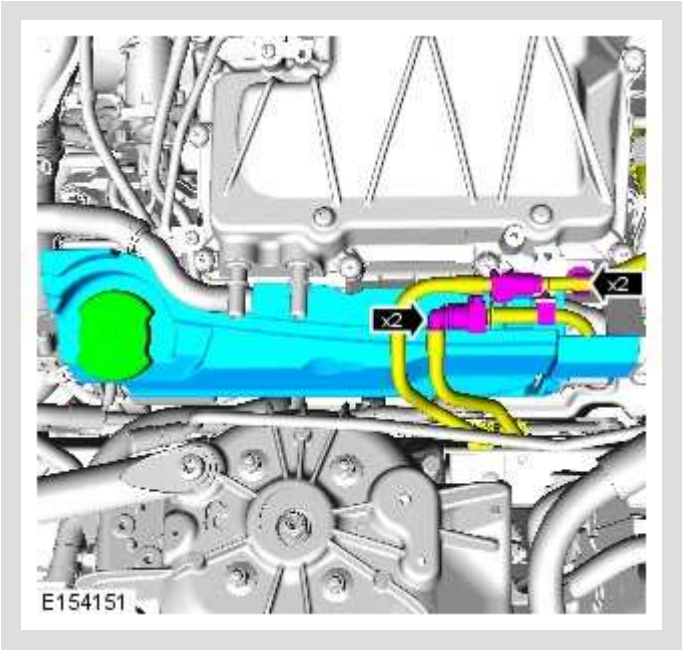


16.



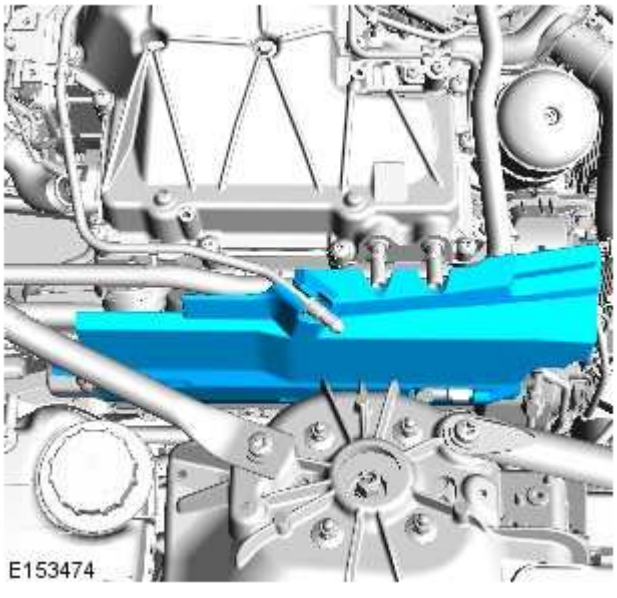
17.

cardiagn.com

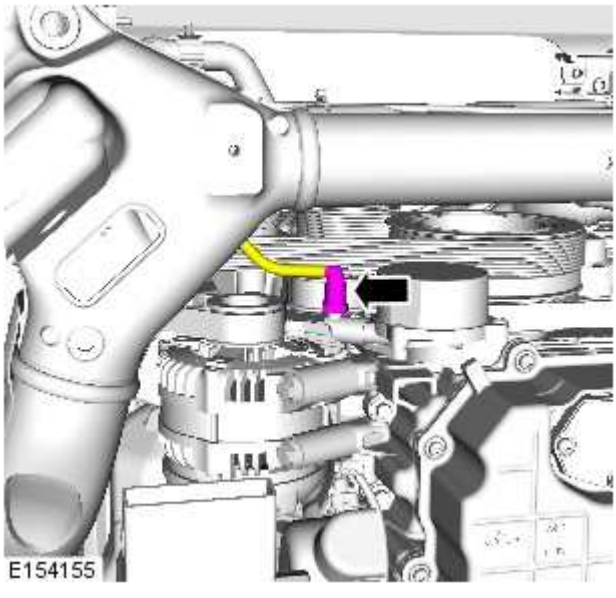


18.

cardiagn.com

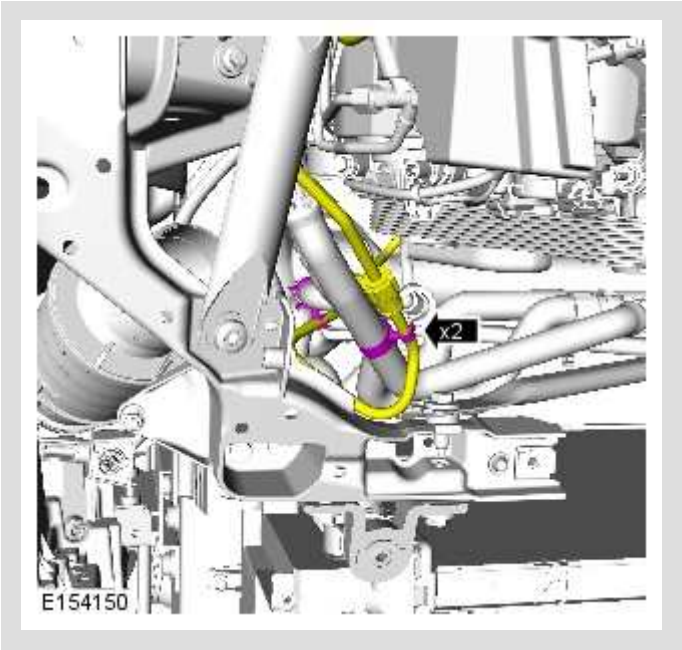


19.



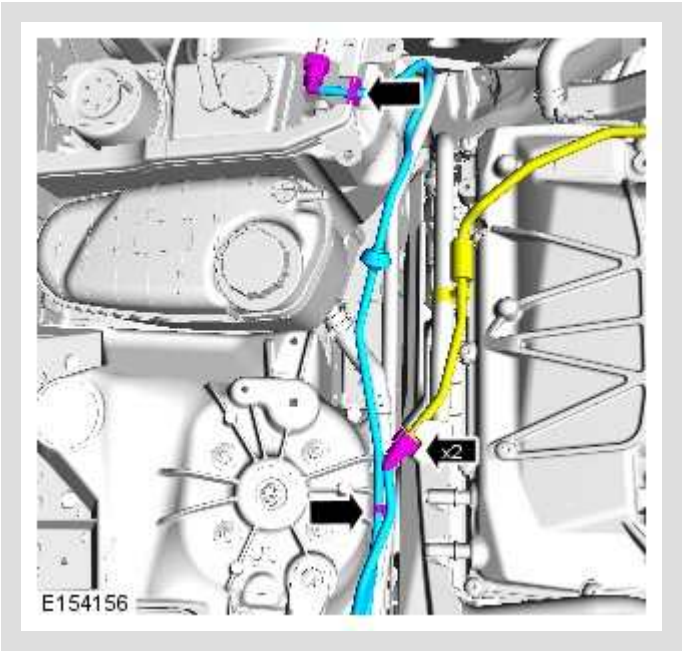
20.

cardiagn.com

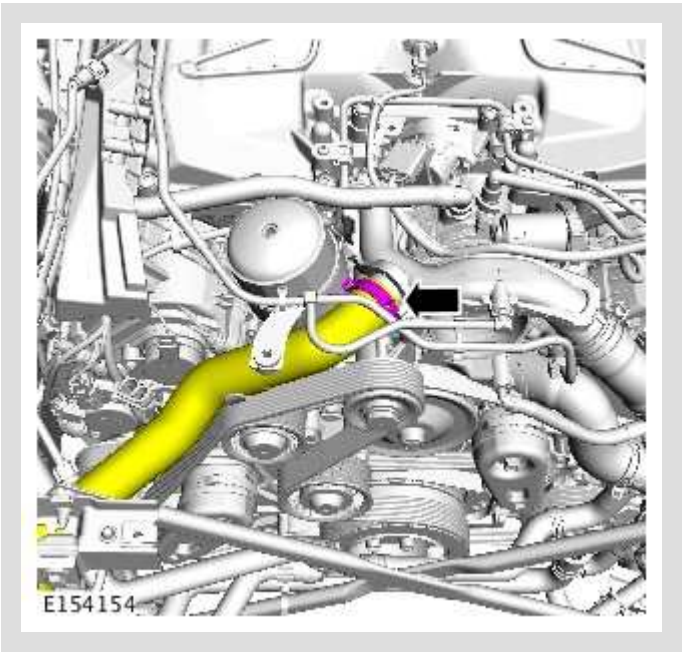


21.

cardiagn.com

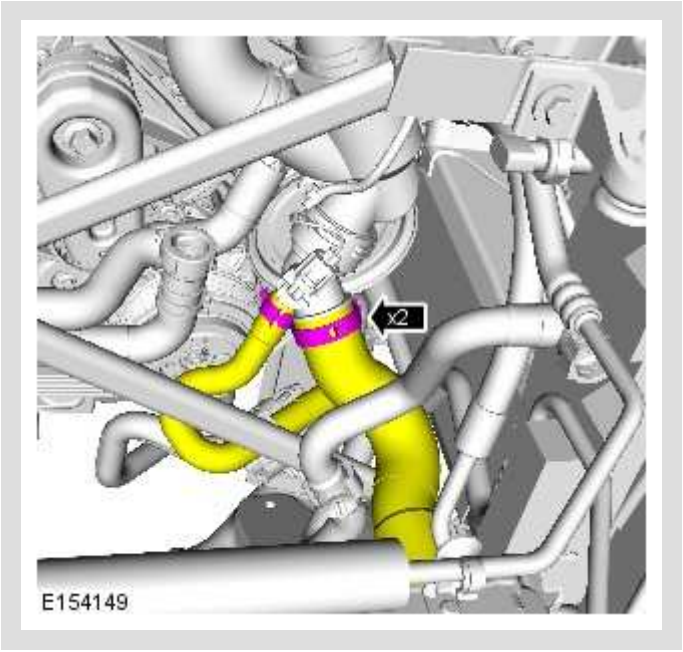


22.



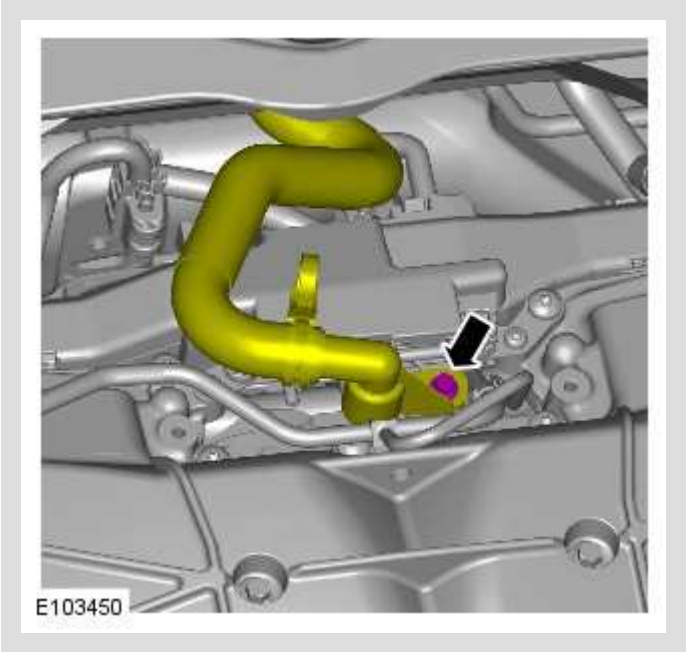
23.

cardiagn.com



24.

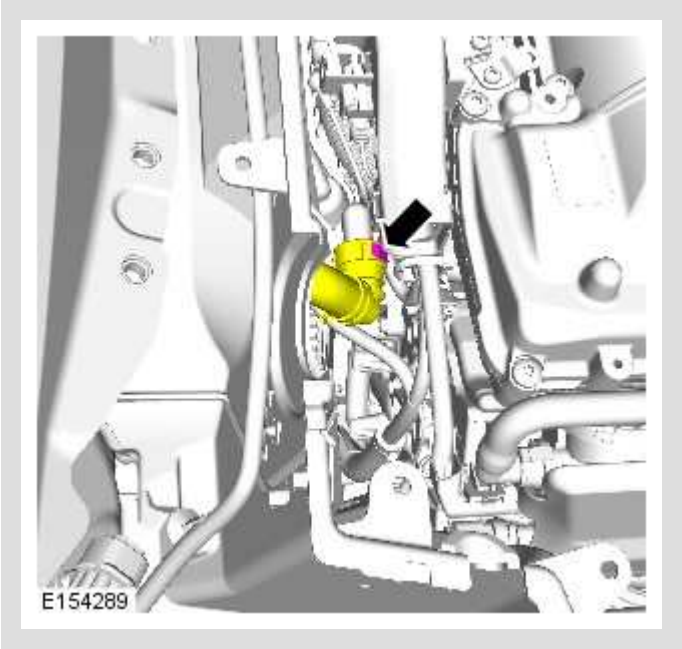
cardiagn.com



25.

NOTE:

Clamp the hose to minimize coolant loss.



26.

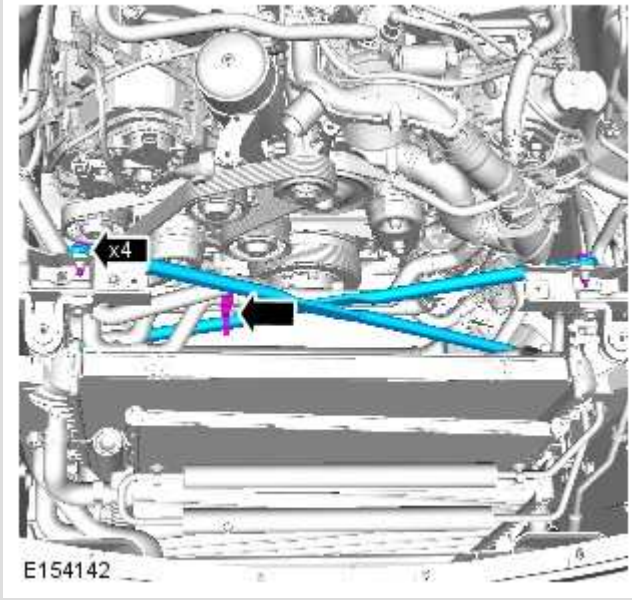
NOTE:

Repeat the procedure for the other side.

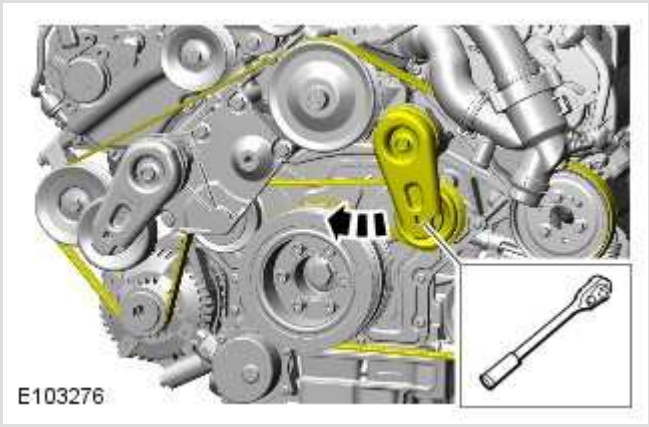
cardiagn.com

Refer to: Fender Splash Shield (501-02 Front End Body Panels, Removal and Installation).

27.



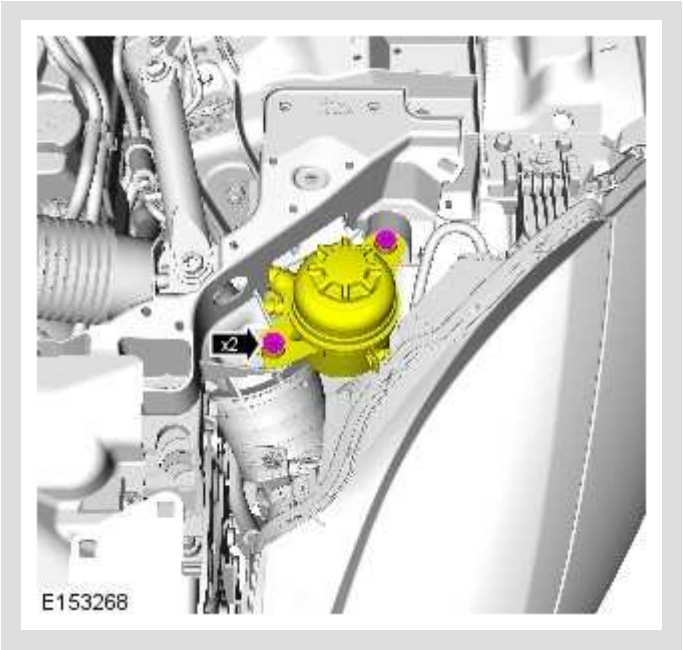
28.



29. Refer to: Power Steering System Filling (211-00 Steering System - General Information, General Procedures).

30.

cardiagn.com

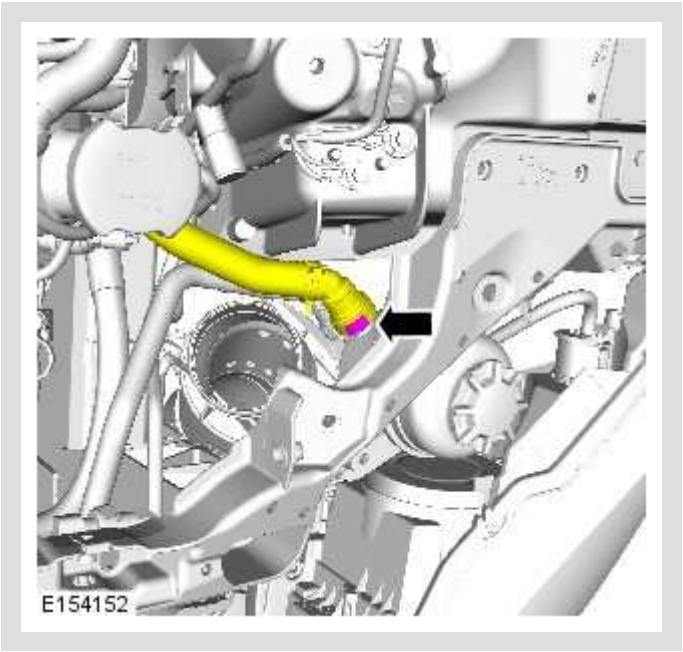


31.

CAUTIONS:

- Be prepared to collect escaping fluids.
- Before disconnecting or removing components, ensure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.
- If power steering fluid is spilt on the paintwork, the effected area must be immediately washed down with cold water. Failure to follow this instruction may result in damage to the vehicle.

cardiagn.com



32.

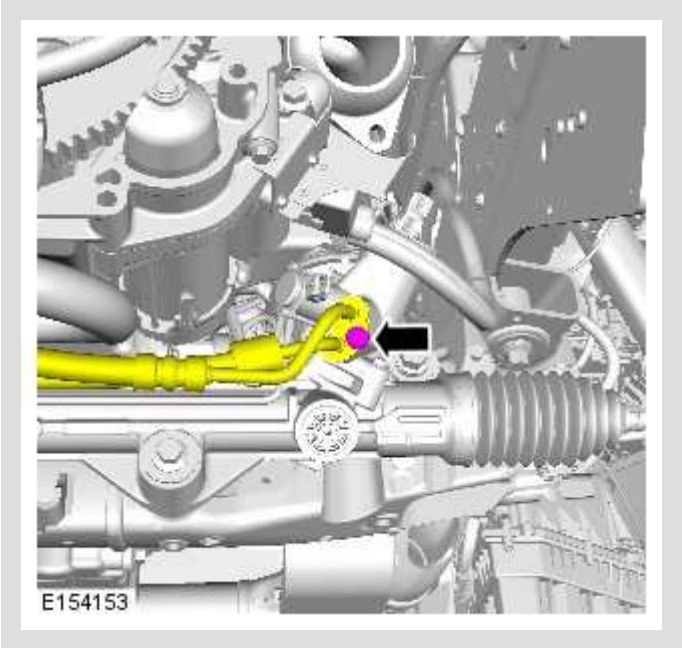
CAUTIONS:

- Before disconnecting or removing components, ensure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.
- If power steering fluid is spilt on the paintwork, the effected area must be immediately washed down with cold water. Failure to follow this instruction may result in damage to the vehicle.
- Cap the power steering line to prevent loses of fluid and dirt ingress.

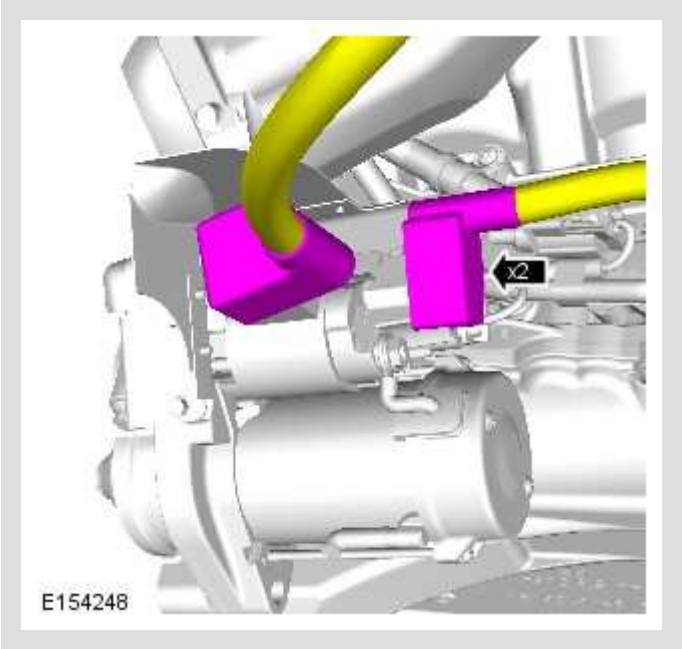
NOTE:

Remove and discard the O-ring seals.

cardiagn.com

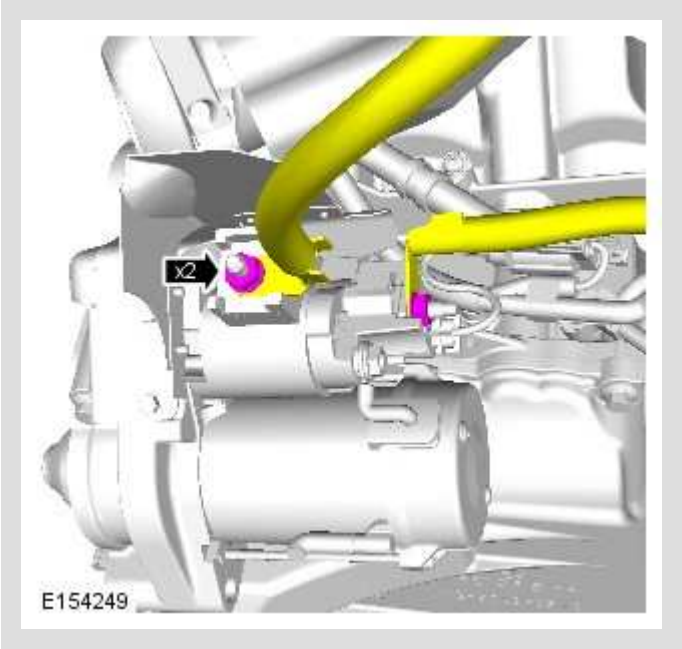


33.

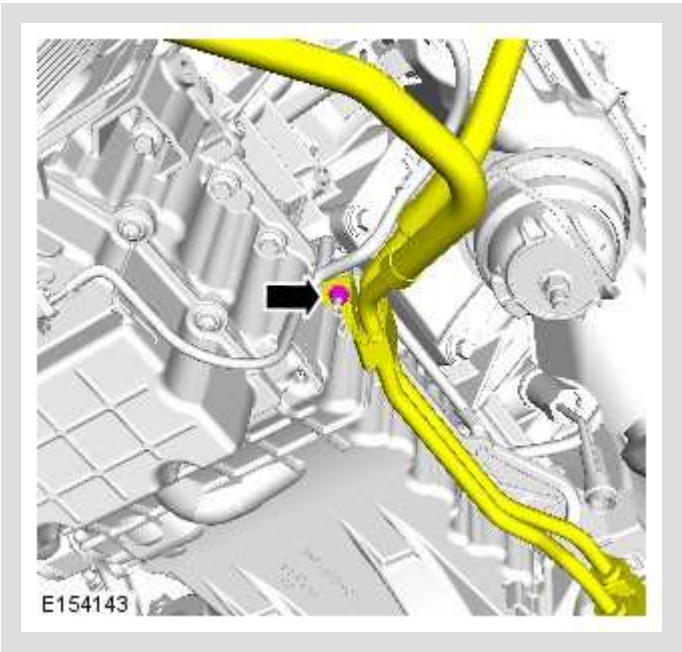


34.

cardiagn.com

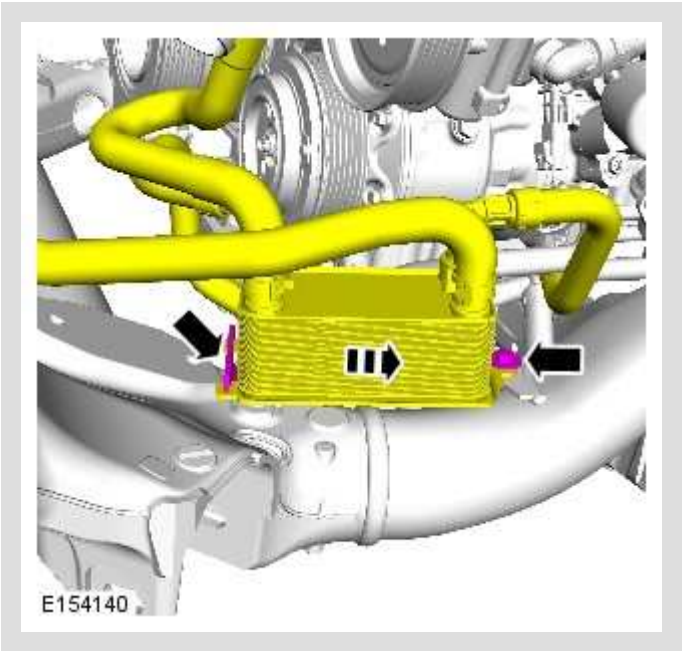


35.

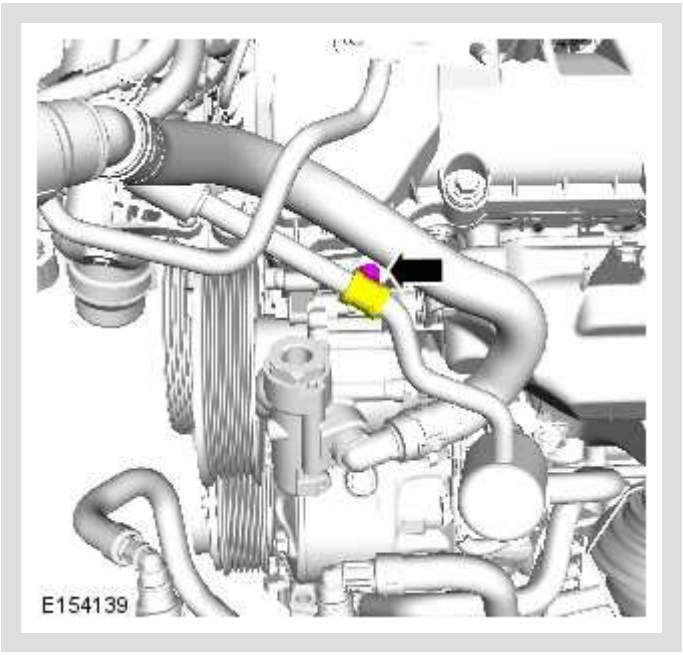


36.

cardiagn.com

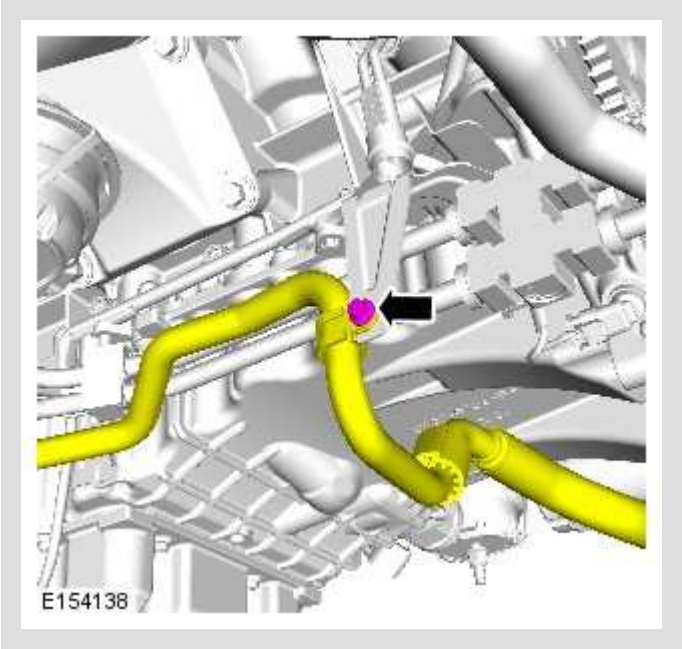


37.

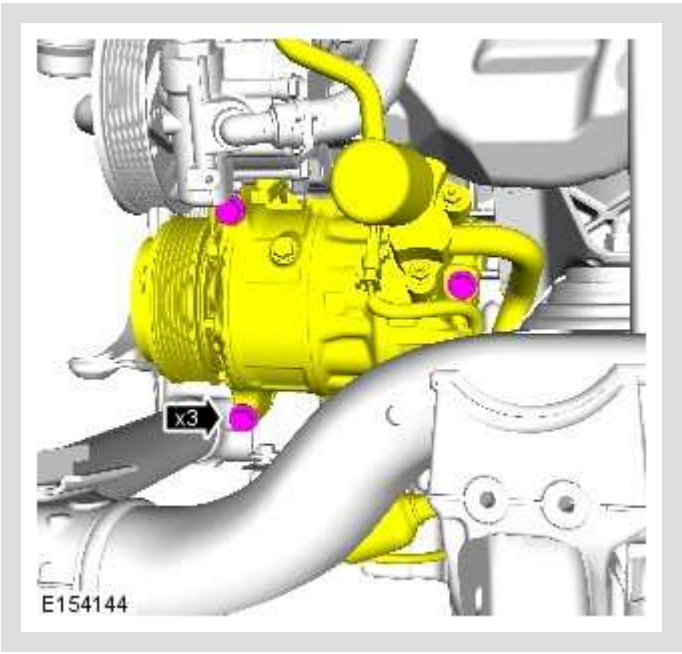


38.

cardiagn.com



39.



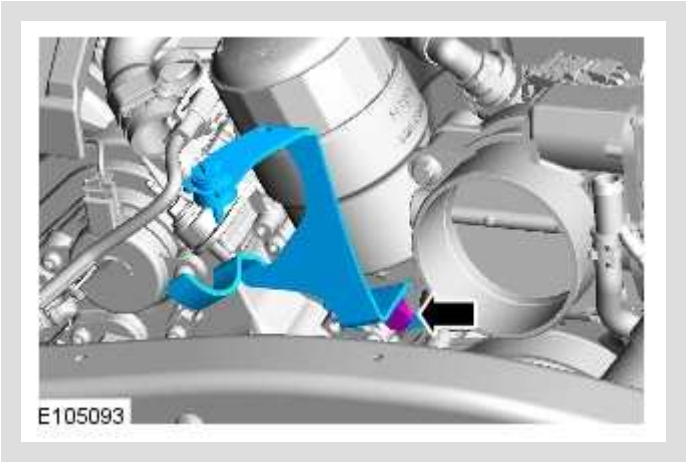
40.

cardiagn.com

Special Tool(s): 303-1435

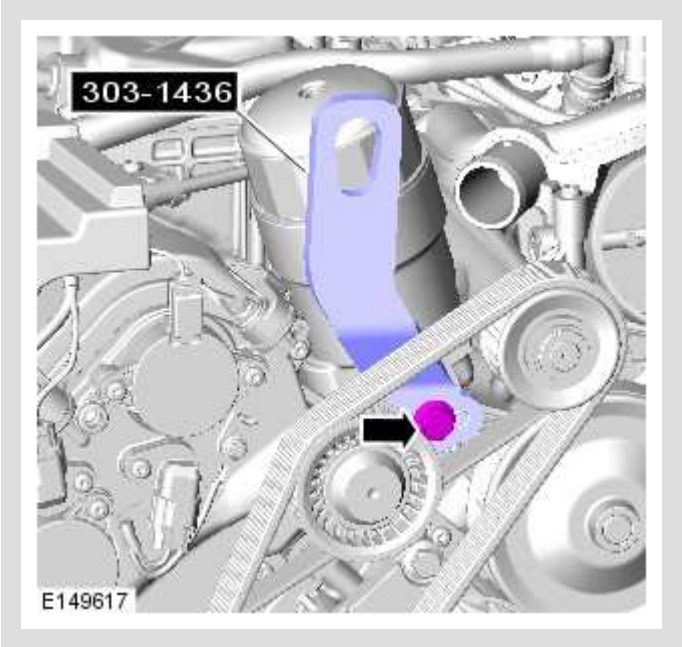
Torque: **25 Nm**

41.



42.

cardiagn.com

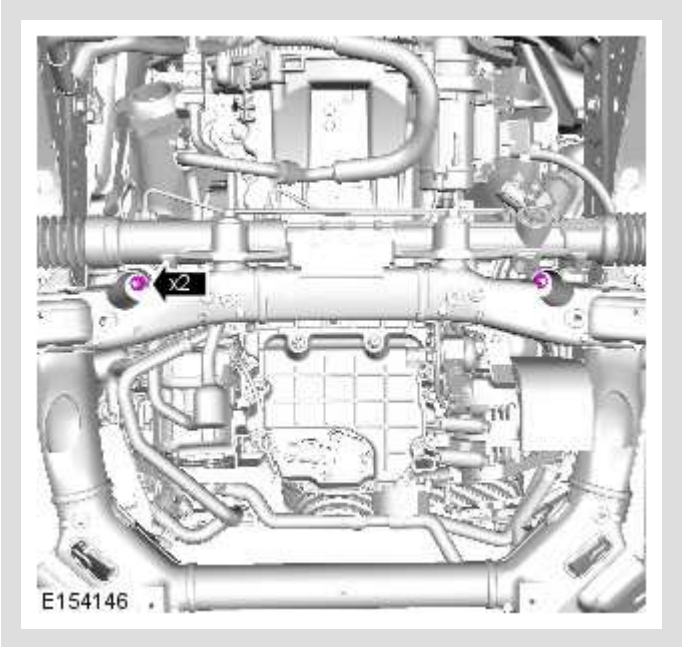


Special Tool(s): 303-1436

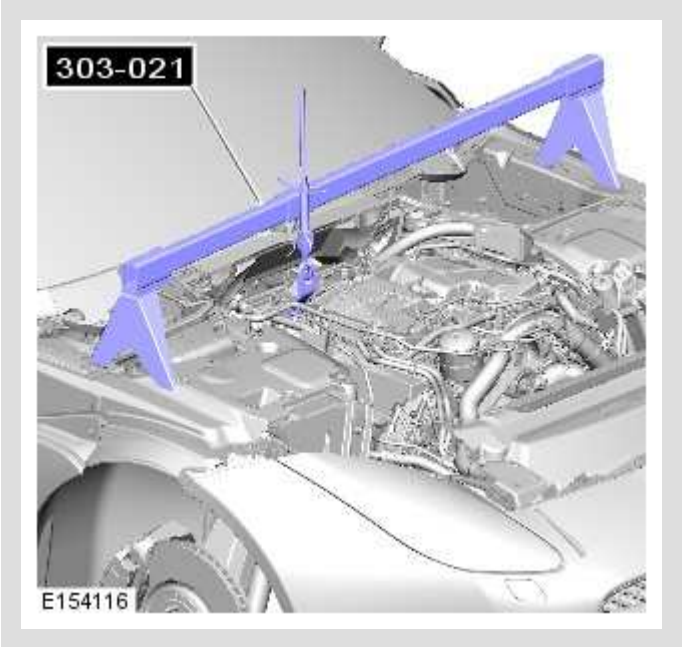
Torque: **25 Nm**

43.

cardiagn.com



44.



Remove the special tool.

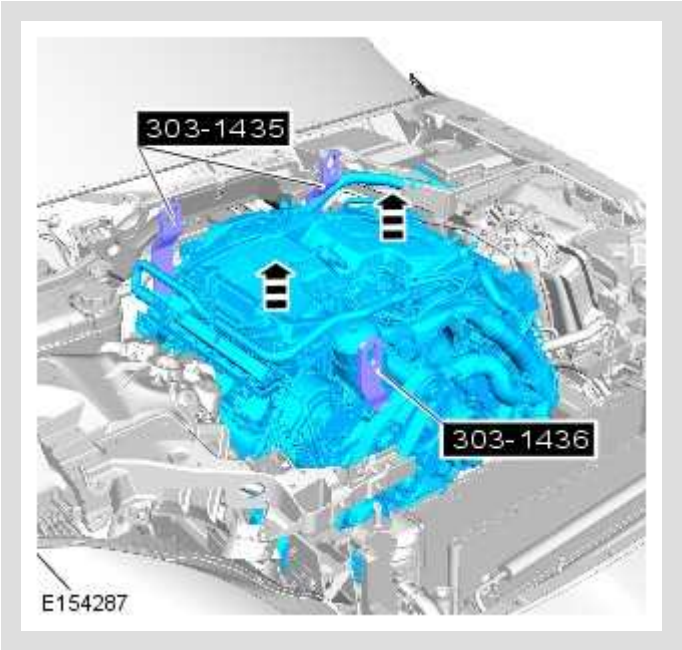
Special Tool(s): 303-021

45.

NOTE:

This step requires the aid of another technician.

cardiagn.com



Using a suitable tool, remove the engine.
Special Tool(s): 303-1435 , 303-1436

cardiagn.com

ENGINE (G1587023)

INSTALLATION

INSTALLATION

SPECIAL TOOL(S)

303-021

Engine support bracket

303-1435

Engine Lifting Brackets Rear

303-1436

Engine Lifting Bracket Front

△ NOTES:

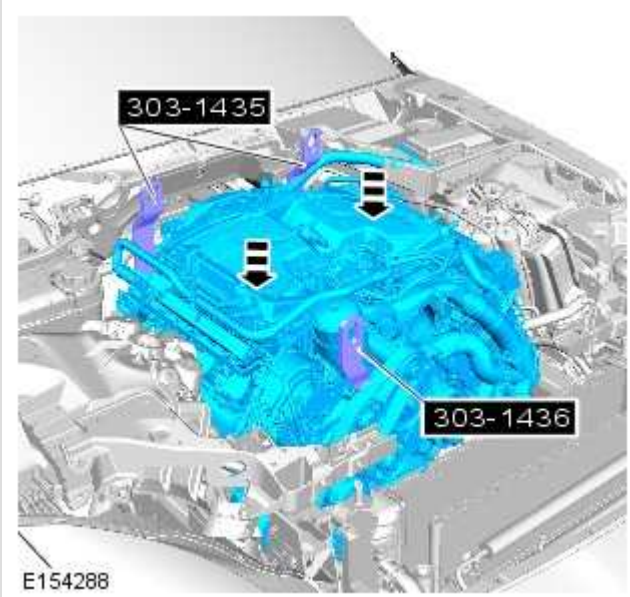
cardiagn.com

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some components shown removed for clarity.

1.

NOTE:

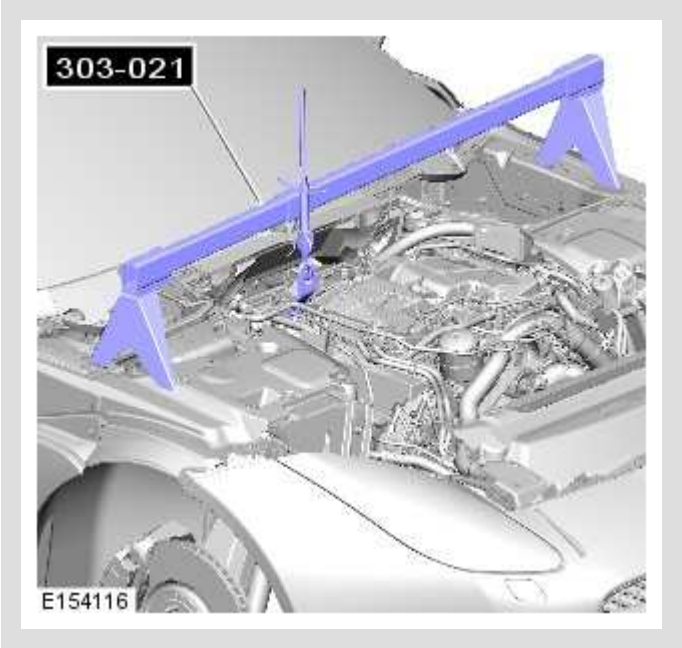
This step requires the aid of another technician.



Using a suitable tool, install the engine.
Special Tool(s): 303-1435 , 303-1436

2.

cardiagn.com

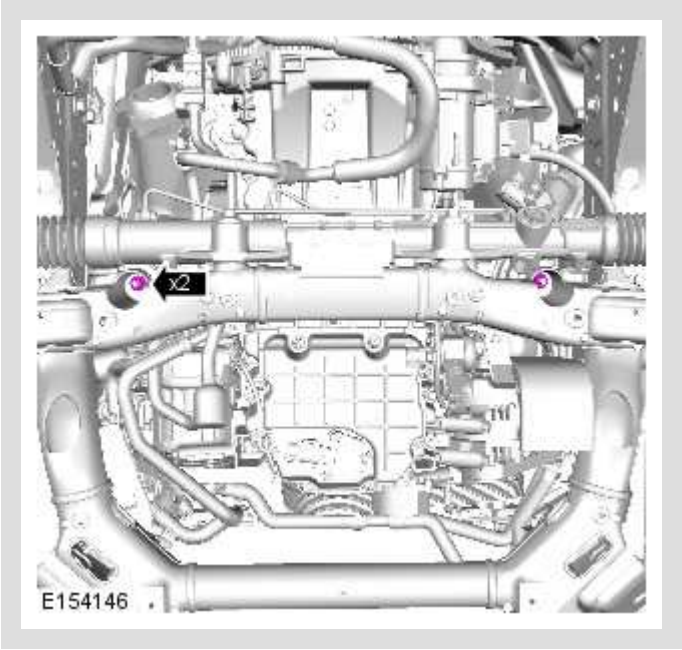


Install the special tool.

Special Tool(s): 303-021

3.

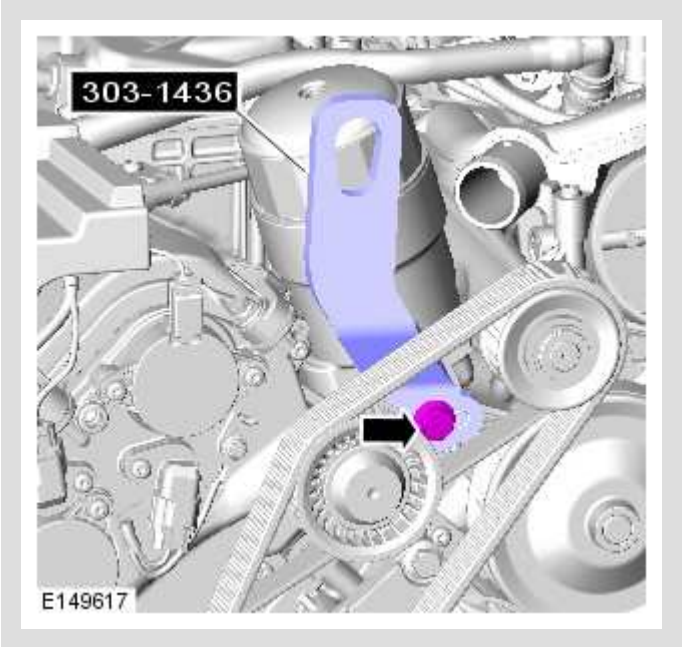
cardiagn.com



Torque: **63 Nm**

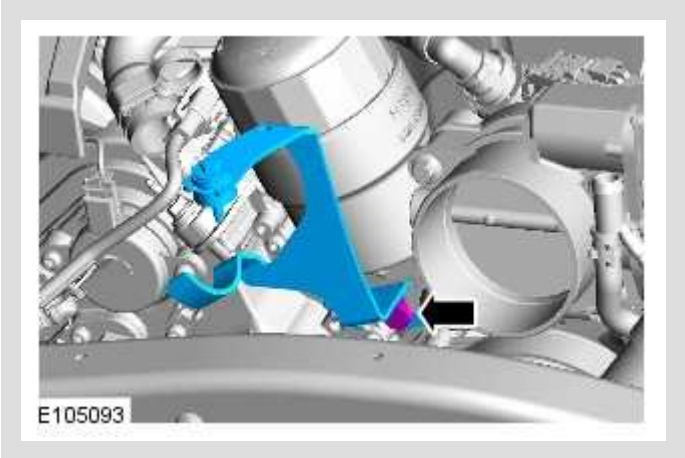
4.

cardiagn.com



Special Tool(s): 303-1436

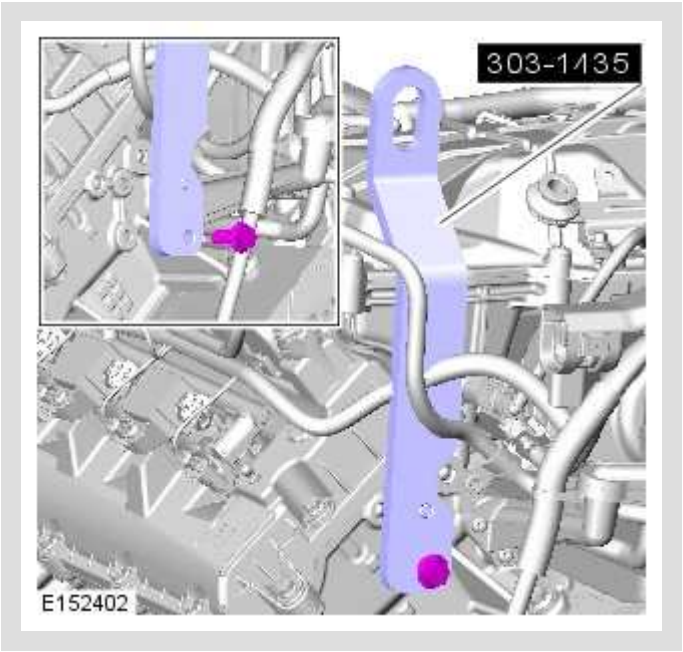
5.



Torque: **25 Nm**

6.

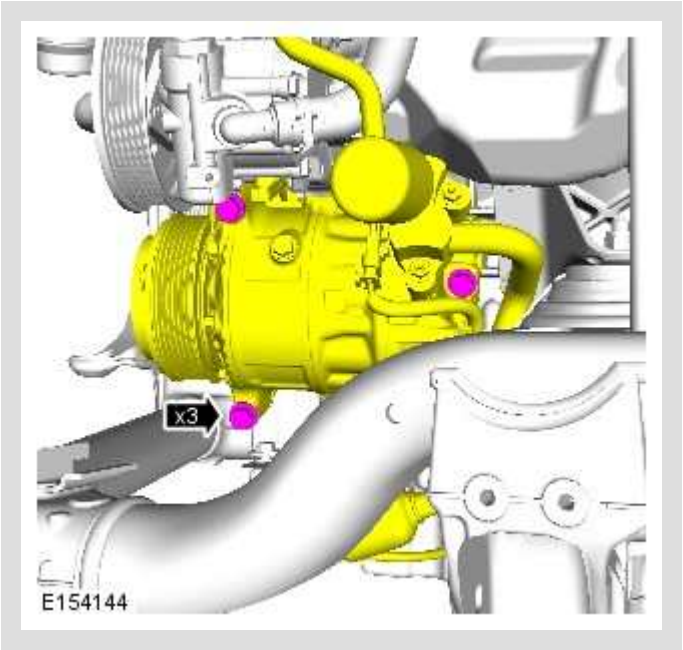
cardiagn.com



Special Tool(s): 303-1435

7.

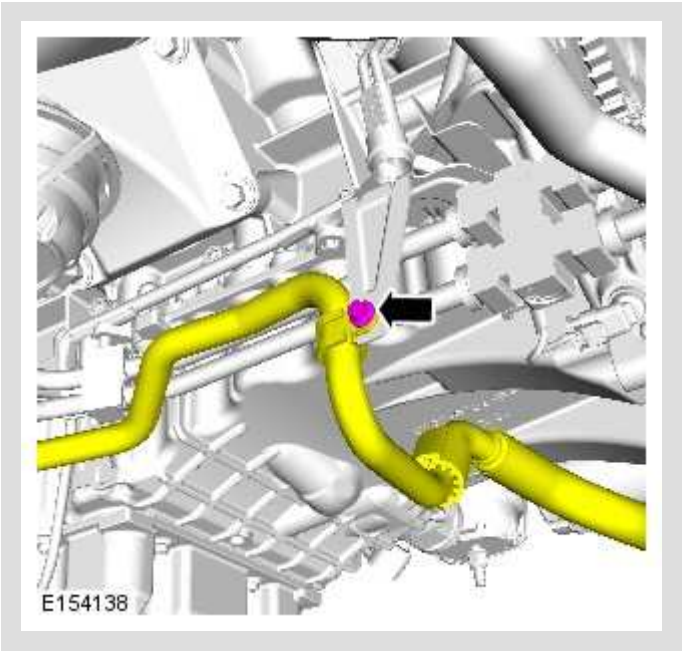
cardiagn.com



Torque: **25 Nm**

8.

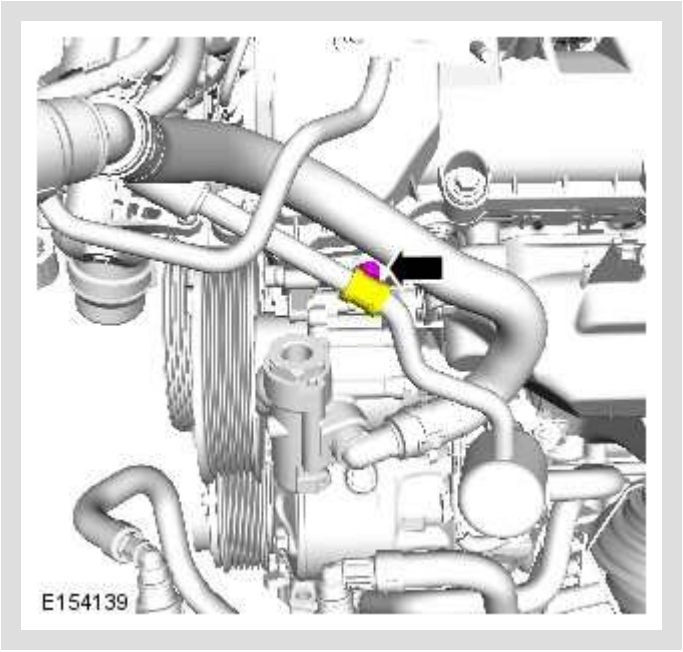
cardiagn.com



Torque: **10 Nm**

9.

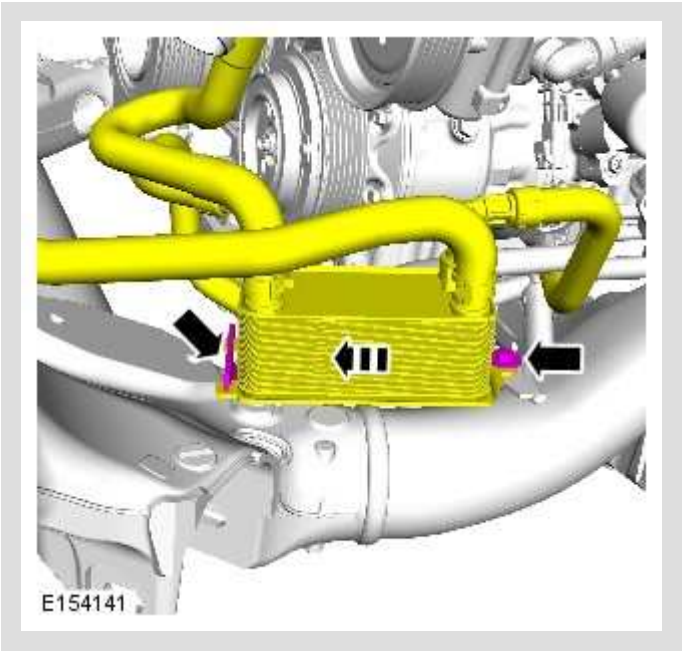
cardiagn.com



Torque: **10 Nm**

10.

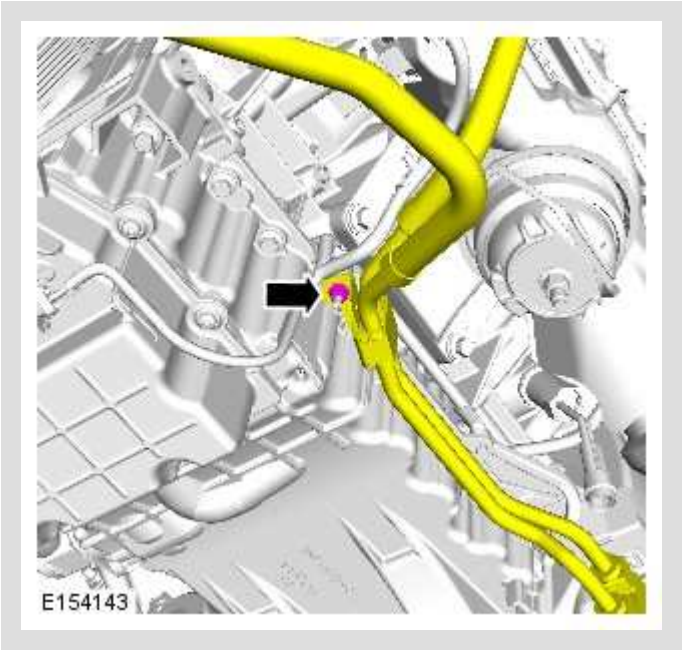
cardiagn.com



Torque: **5 Nm**

11.

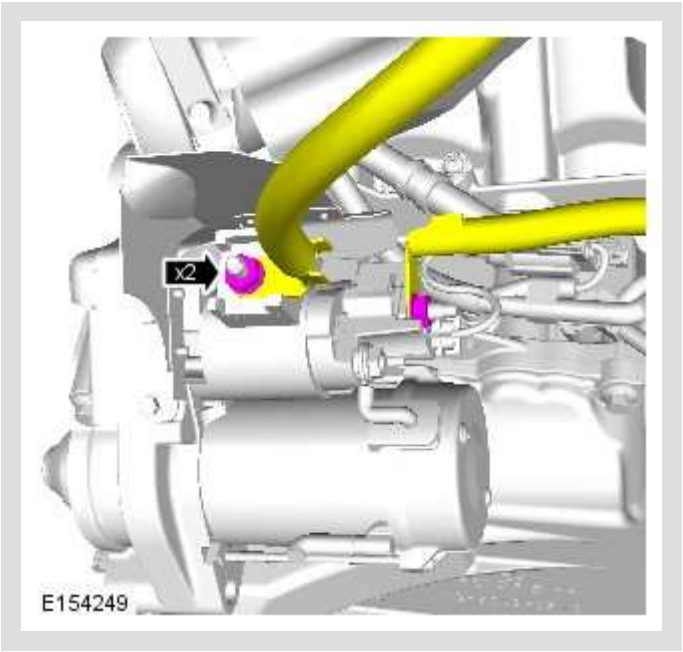
cardiagn.com



Torque: **10 Nm**

12.

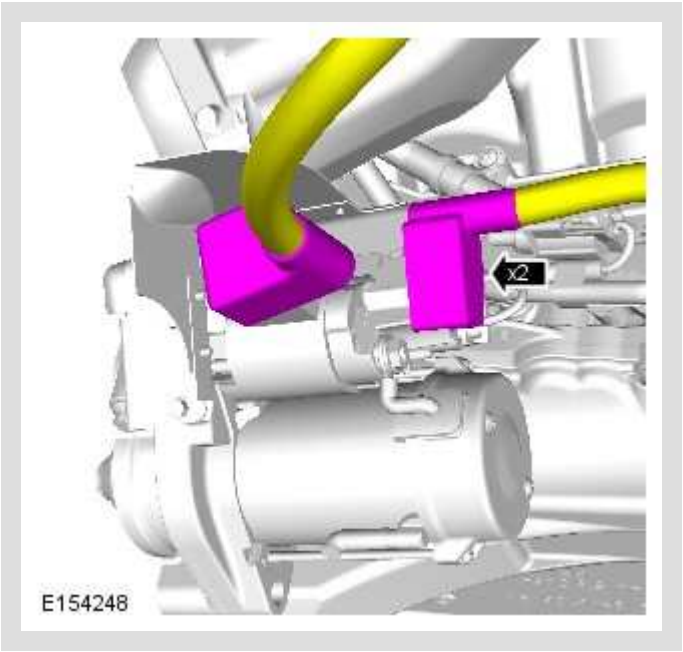
cardiagn.com



Torque: **12 Nm**

13.

cardiagn.com



14.

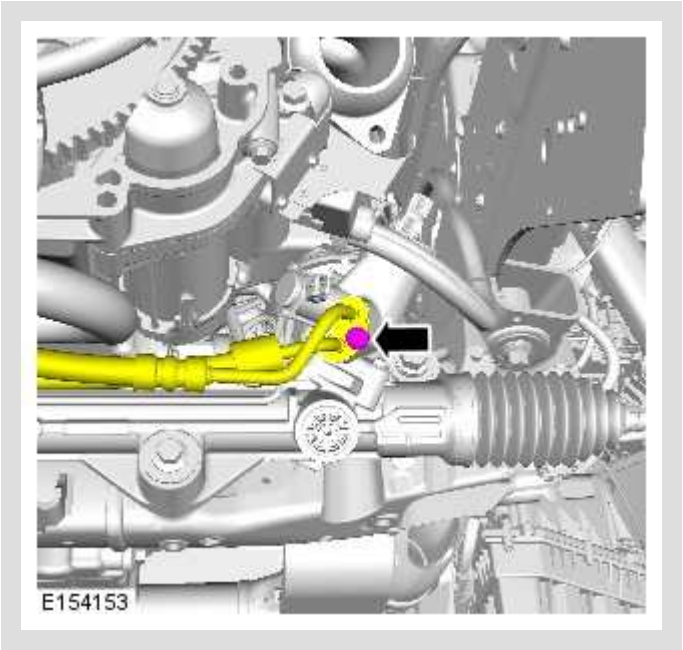
CAUTION:

Make sure that the area around the component is clean and free of foreign material.

NOTE:

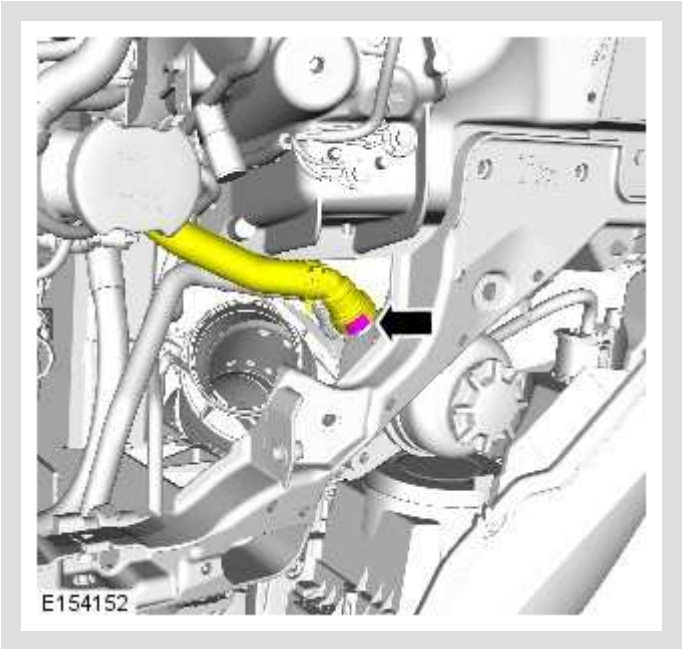
Install new O-ring seals.

cardiagn.com



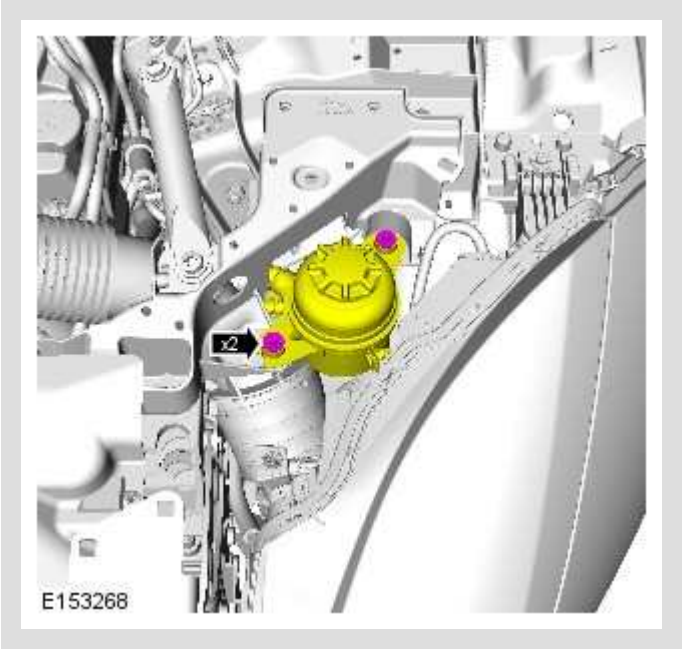
Torque: **15 Nm**

15.



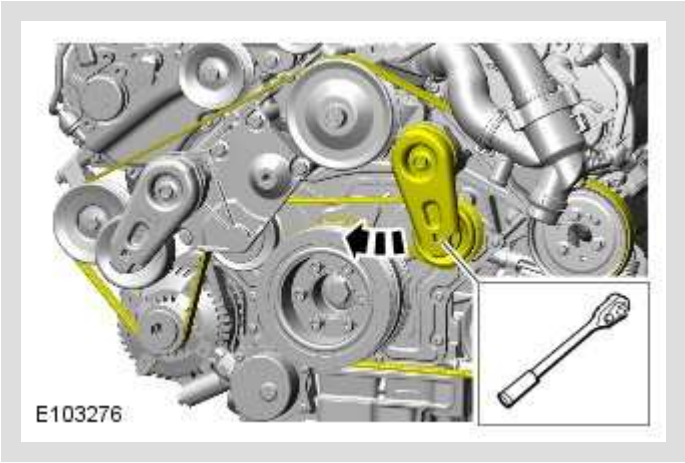
16.

cardiagn.com



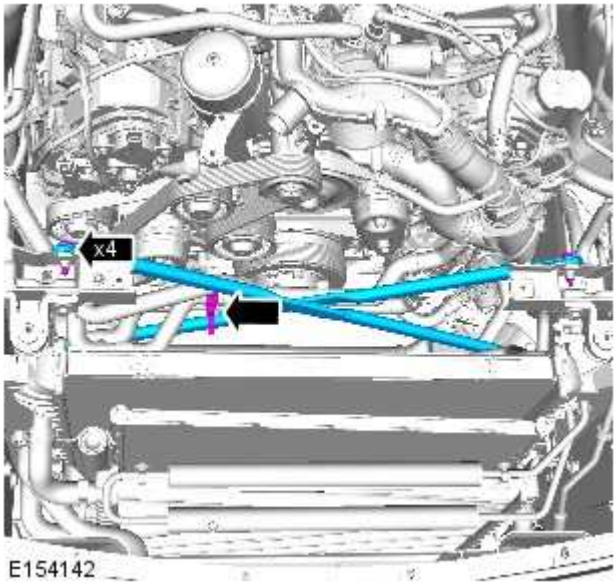
Torque: **10 Nm**

17. Refer to: Power Steering System Filling (211-00 Steering System - General Information, General Procedures).

18. 

19.

cardiagn.com



Torque: **25 Nm**

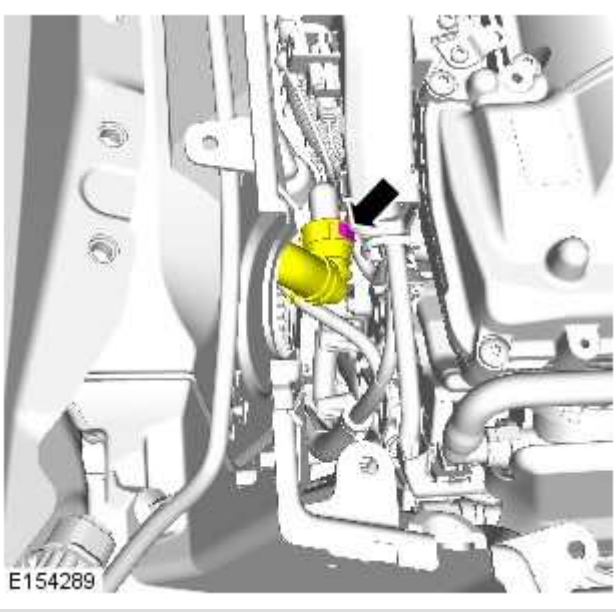
20.

NOTE:

Repeat the procedure for the other side.

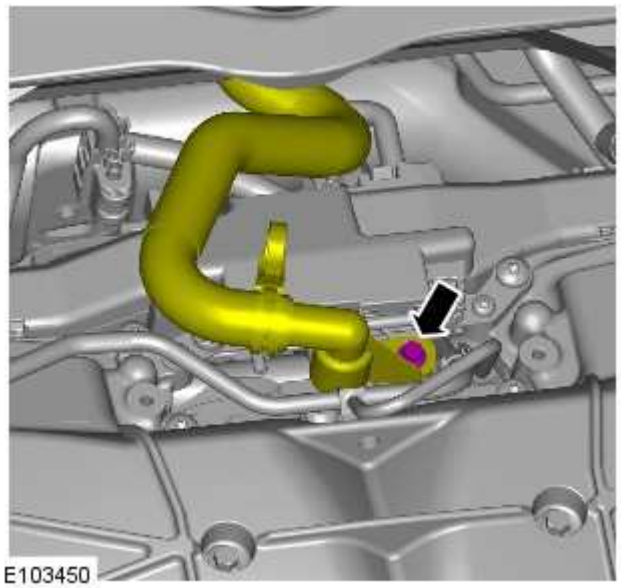
Refer to: Fender Splash Shield (501-02 Front End Body Panels, Removal and Installation).

21.



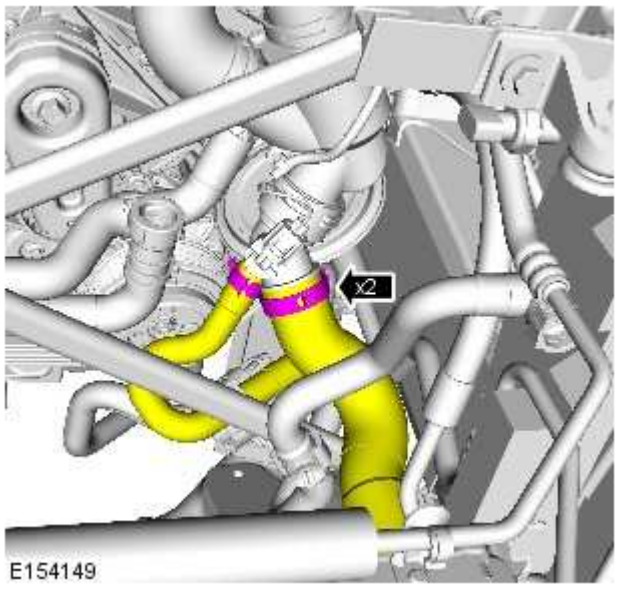
cardiagn.com

22.



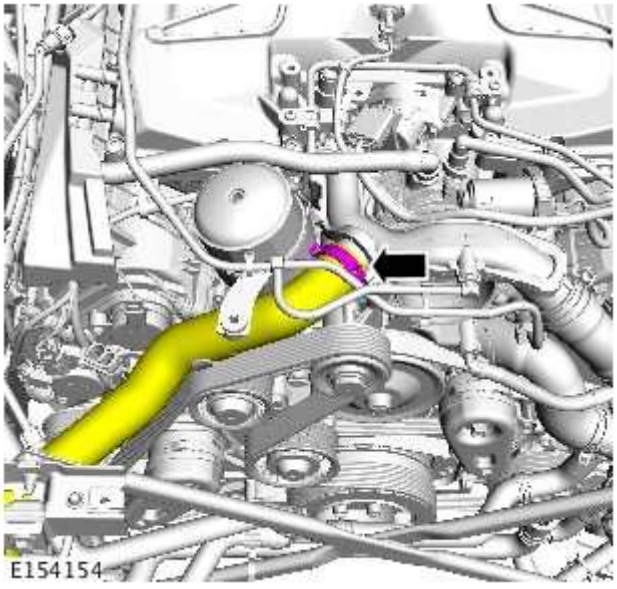
Torque: **10 Nm**

23.

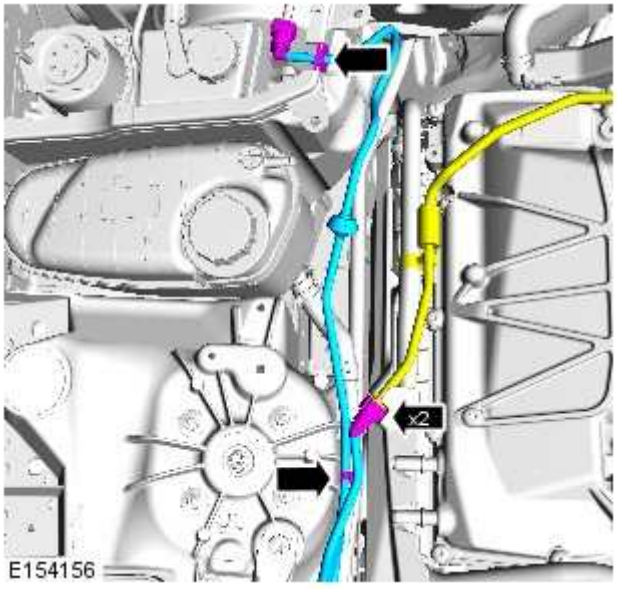


24.

cardiagn.com

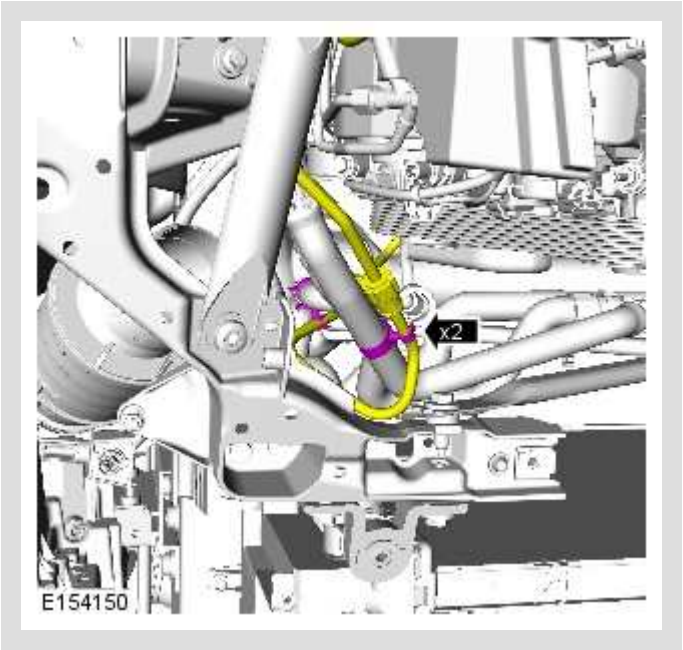


25.

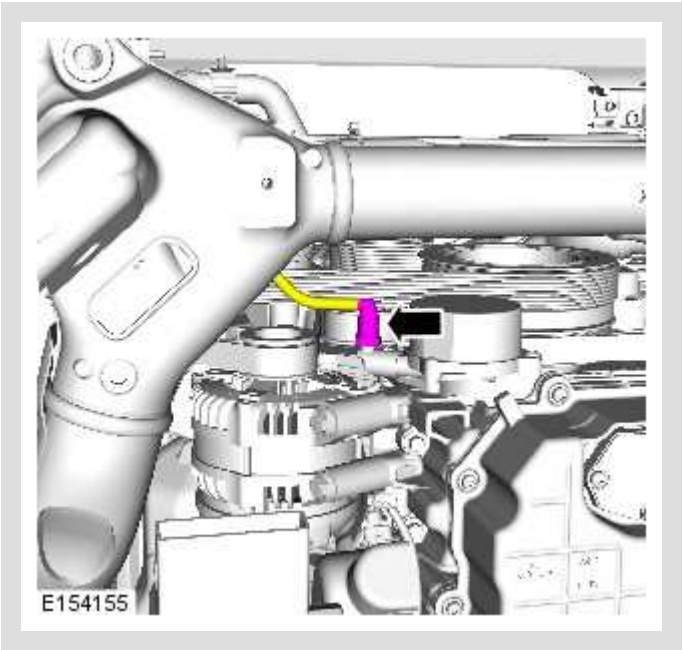


cardiagn.com

26.

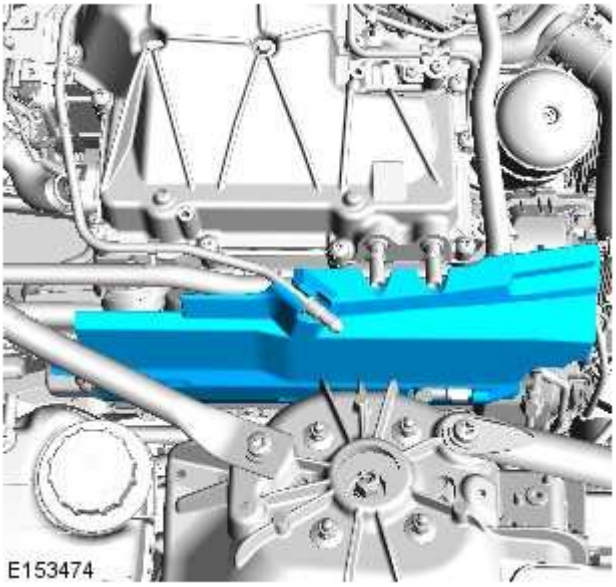


27.

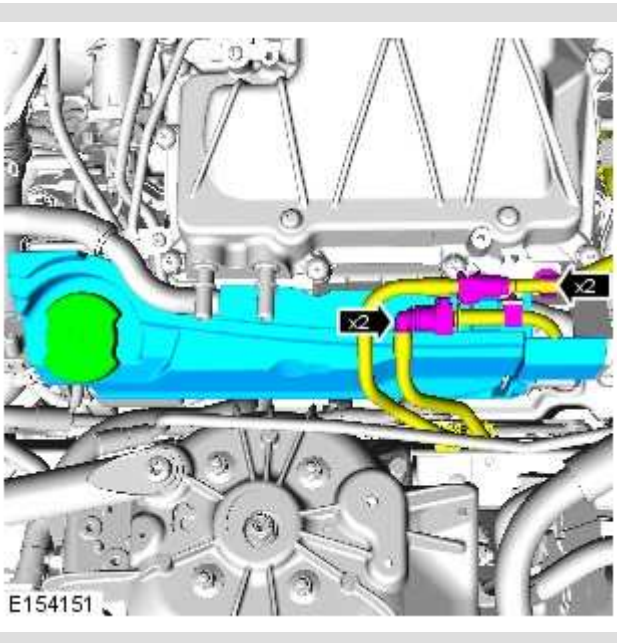


28.

cardiagn.com

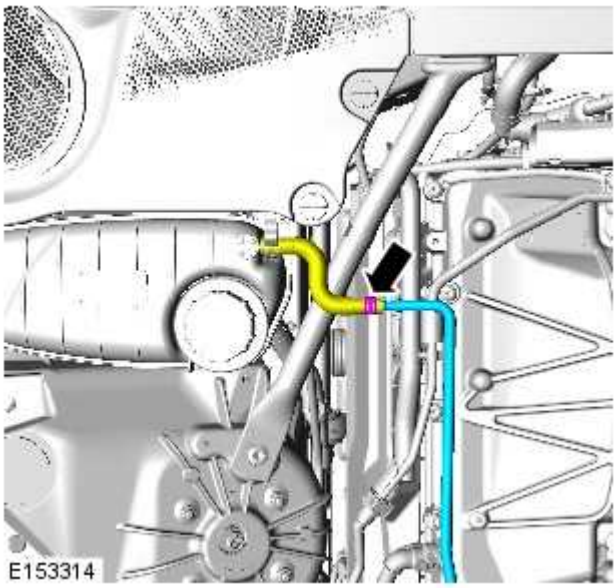


29.

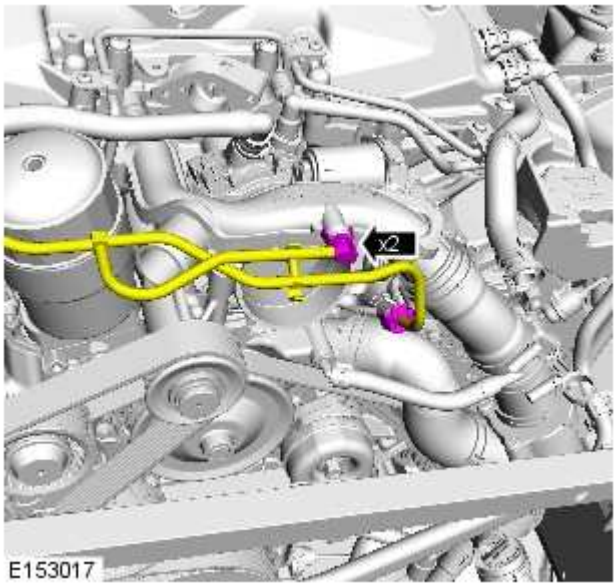


cardiagn.com

30.

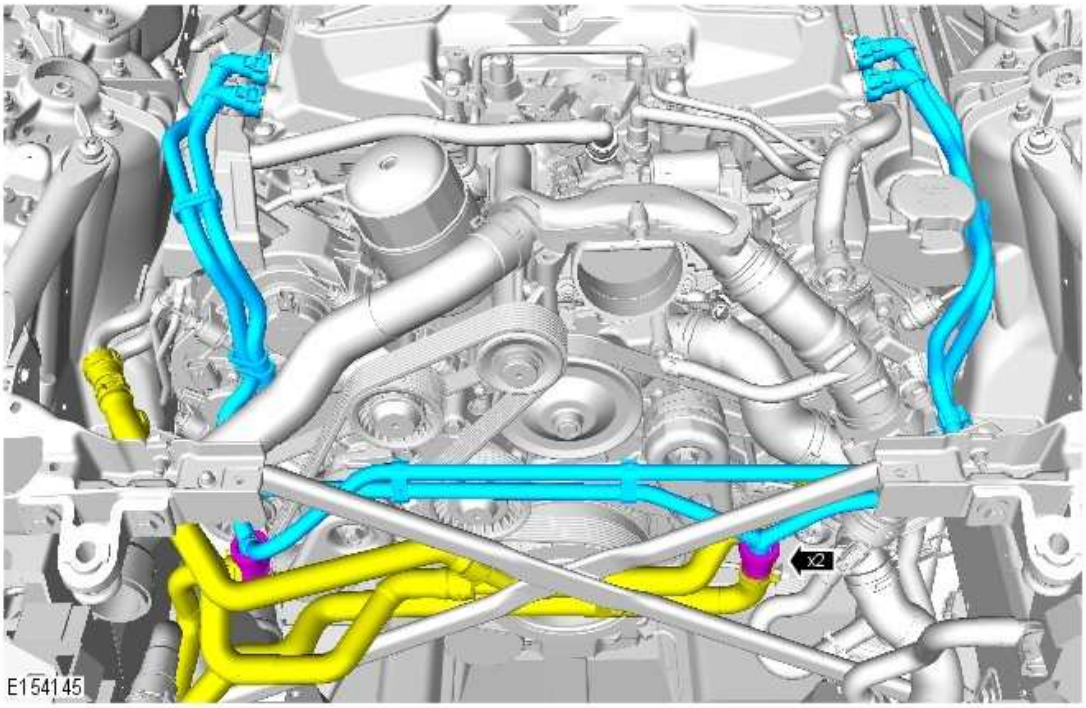


31.



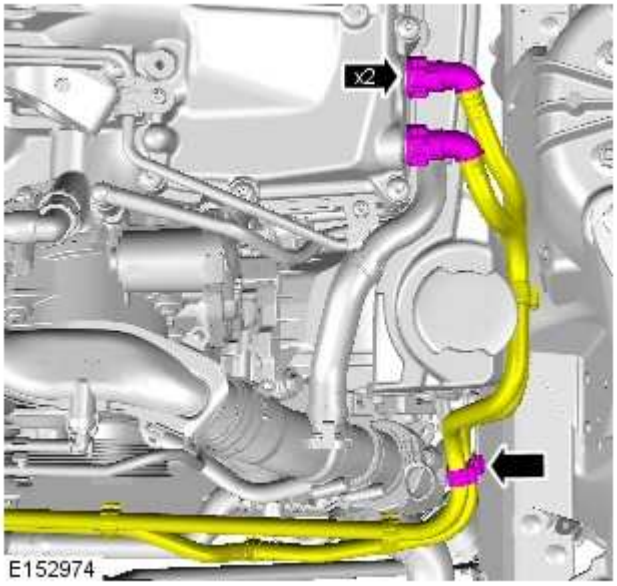
32.

cardiagn.com

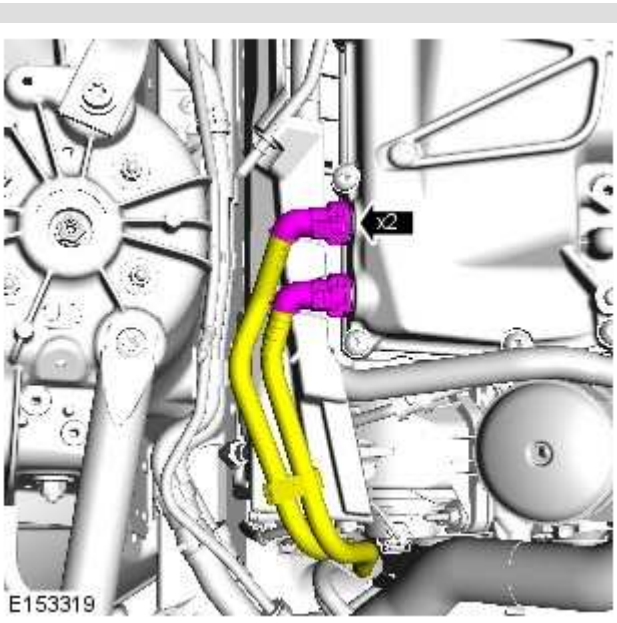


33.

cardiagn.com

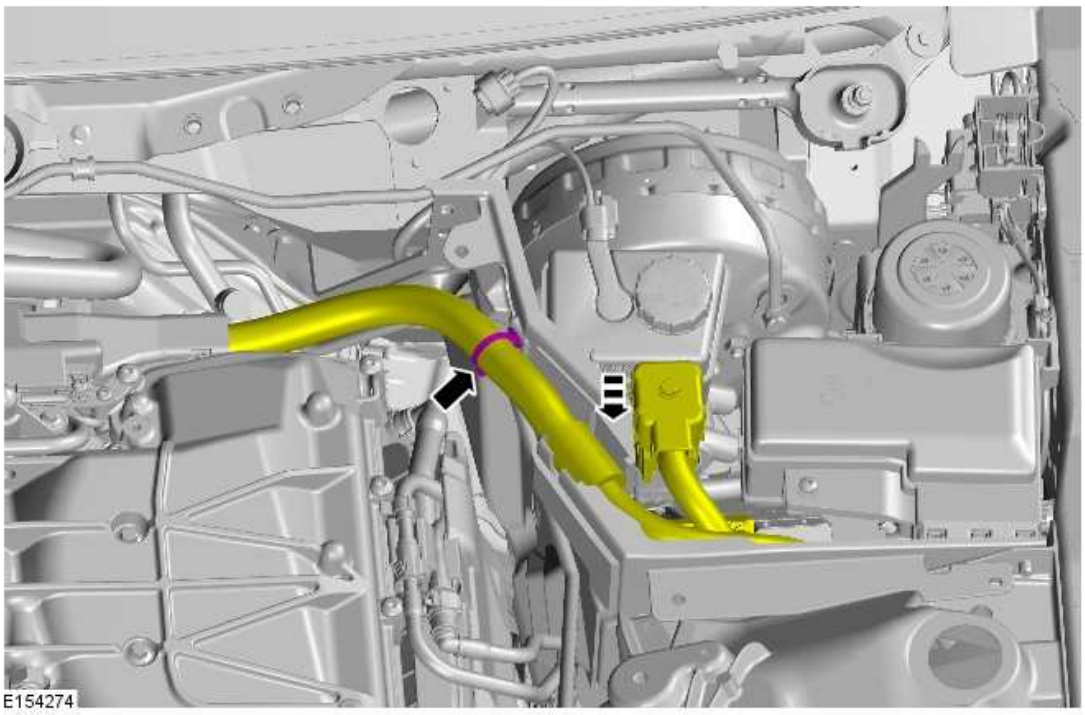


34.



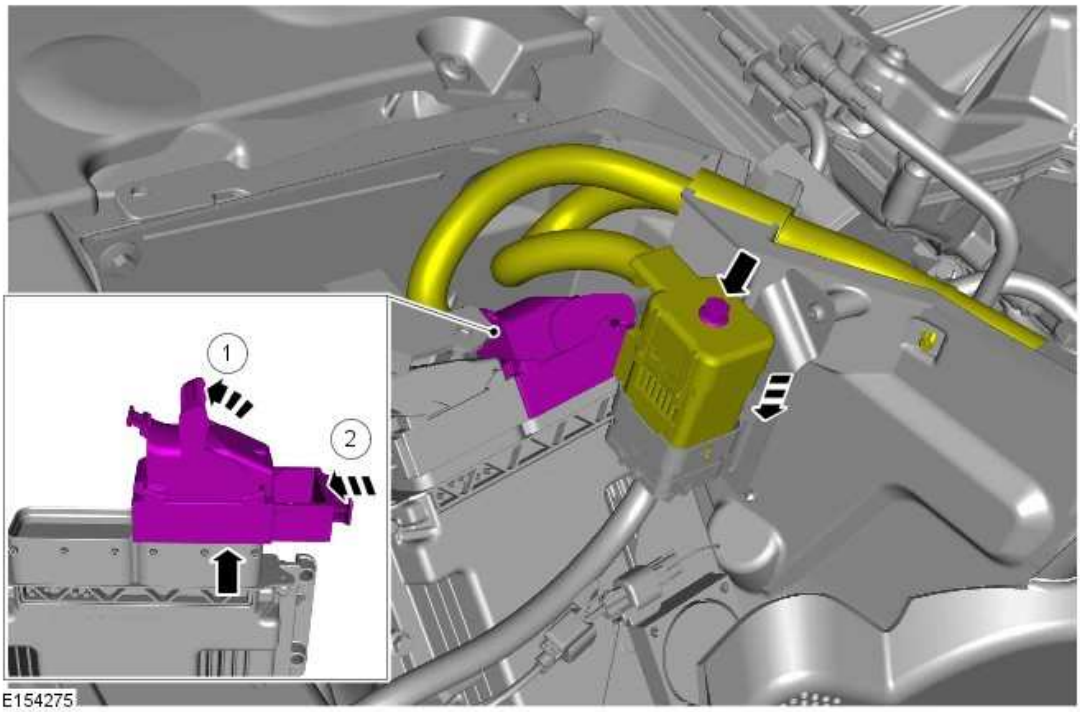
35.

cardiagn.com



36.

cardiagn.com



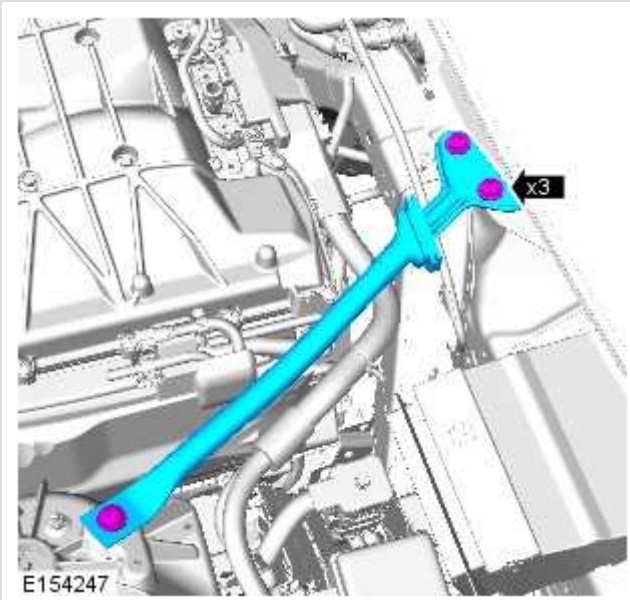
Torque: **6 Nm**

37.

NOTE:

The step must be carried out on both sides.

cardiagn.com



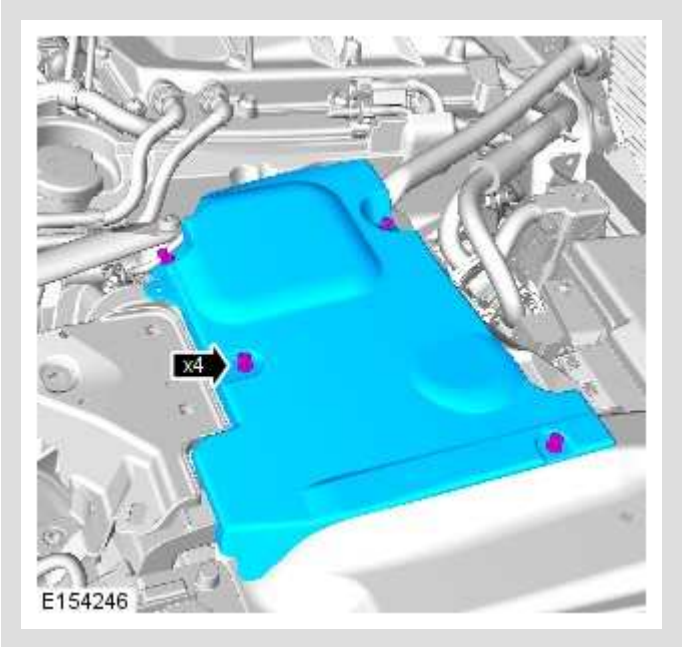
Torque: **55 Nm**

38.

NOTE:

The step must be carried out on both sides.

cardiagn.com



39. Refer to: Transmission (307-01B Automatic Transmission /Transaxle - V8 S/C 5.0L Petrol, Installation).

40. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

41. Refer to: Air Cleaner Outlet Pipe RH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

42. Refer to: Air Cleaner Outlet Intermediate Pipe LH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

43. Refer to: Cooling Fan Motor and Shroud (303-03C Engine Cooling - V8 S/C 5.0L Petrol, Removal and Installation).

44. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

ENGINE OIL DRAINING AND FILLING (G1586896)

GENERAL PROCEDURES

12.60.07	ENGINE OIL - DRAIN AND REFILL	ALL DERIVATIVES	0.5	USED WITHINS	

DRAINING

WARNING:

The spilling of hot engine oil is unavoidable during this procedure, care must be taken to prevent scalding.

NOTES:

- Clean the components general area prior to dismantling.
- Some variation in the illustrations may occur, but the essential information is always correct.

1.

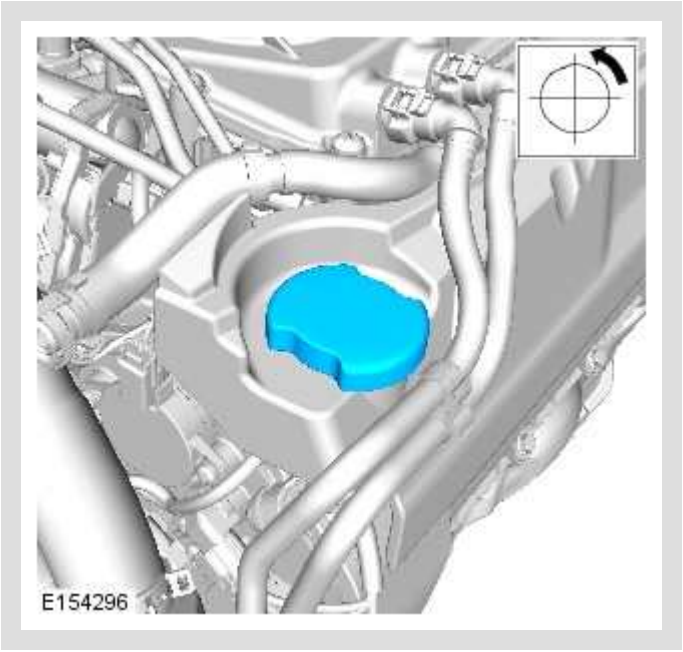
CAUTION:

Make sure the engine is warm.

cardiagn.com

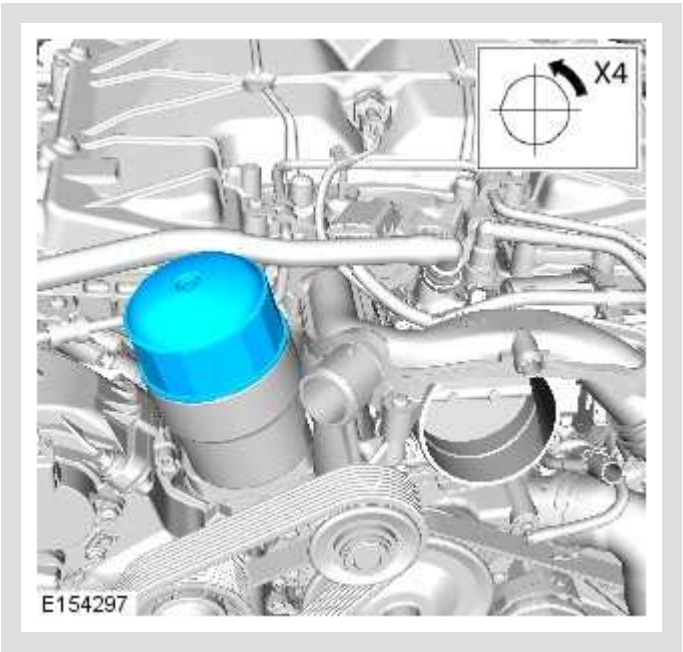
Start the engine and allow to run for 10 minutes, stop the engine.

2.



3. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

4.



Loosen the element cover 4 complete turns to allow engine oil to drain from the filter cover.

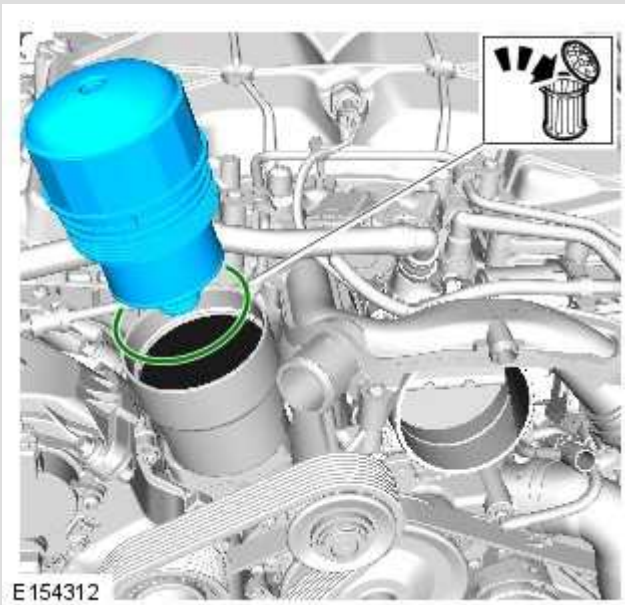
Make sure that the O-ring seal is exposed.

cardiagn.com

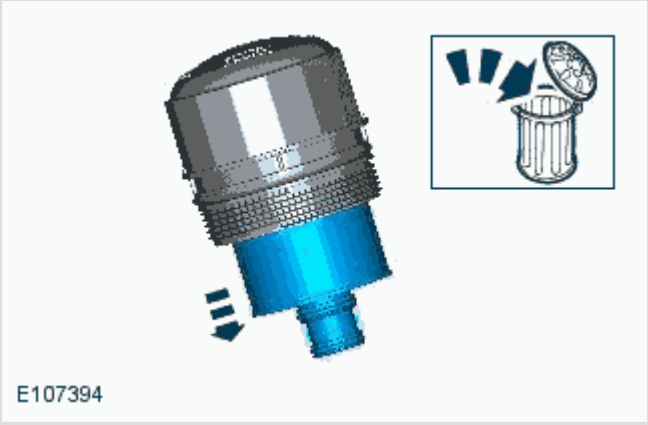
5.

NOTES:

- Allow 10 minutes for the engine oil to drain from the oil filter housing.
- Remove and discard the O-ring seal.
- Position cloth to collect fluid spillage, make sure fluid does not come in to contact with the accessory drive belts.



6.



Remove and discard the oil filter element.

7.

WARNING:

cardiagn.com

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

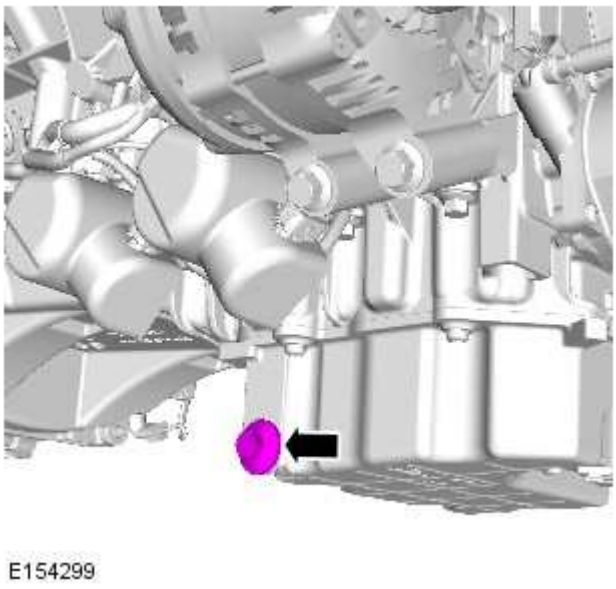
8. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

9. **CAUTIONS:**

- Be prepared to collect escaping oil.
- Allow at least 10 minutes for the engine oil to drain.

NOTE:

Discard the oil pan drain plug.


E154299

FILLING

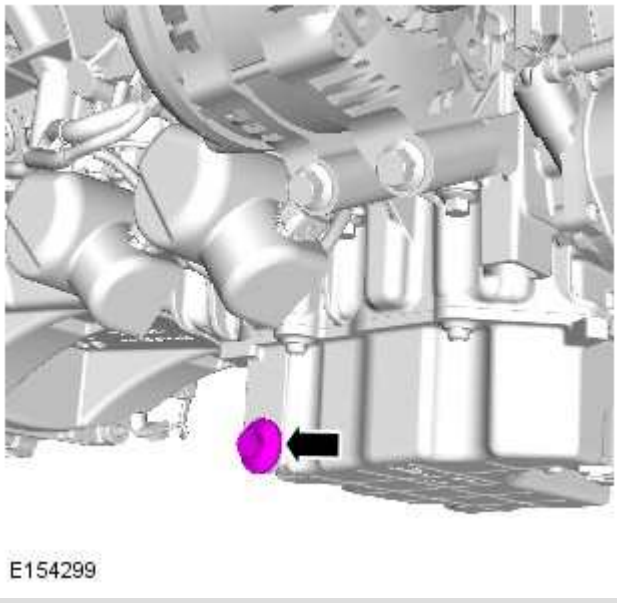
1. **CAUTION:**

cardiagn.com

Make sure that the area around the component is clean and free of foreign material.

NOTE:

Install a new oil pan drain plug.



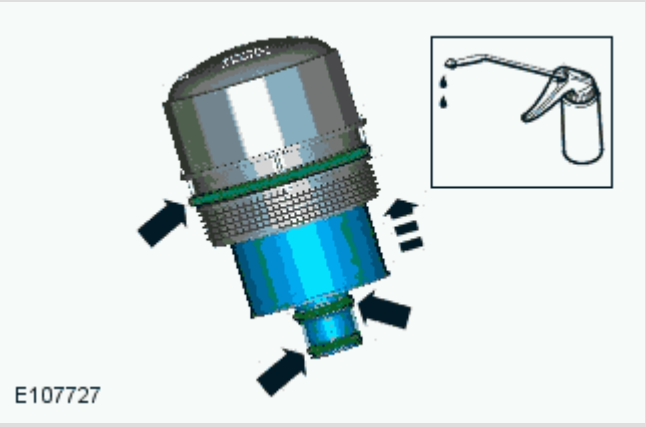
Torque: **24 Nm**

2. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

3. **NOTE:**

Install new O-ring seals.

cardiagn.com

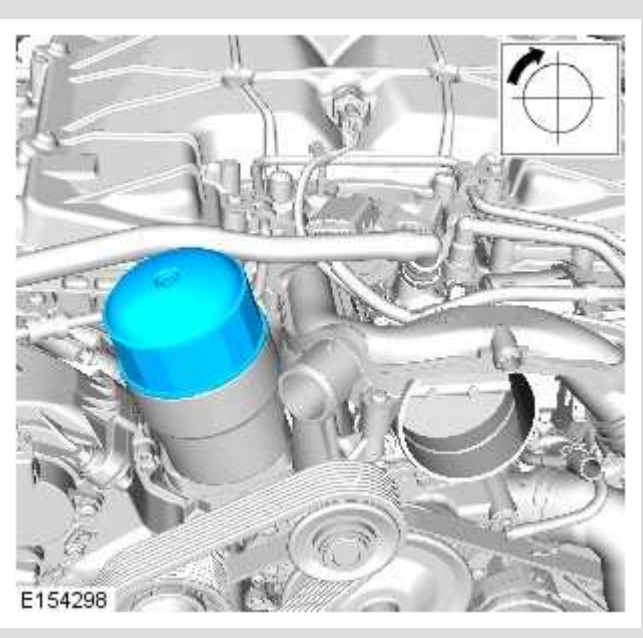


Lubricate the oil filter element O-ring seal with clean engine oil.

4.

CAUTION:

Tighten the component finger tight first.



Torque: **25 Nm**

cardiagn.com

5.

CAUTION:

Make sure that the vehicle is left for 5 minutes from filling with oil and that the engine oil level is reading at least minimum, before starting the engine. To check engine oil level follow steps 9-13.

Fill the engine with oil.

Clean any residual engine oil from the oil filler cap area.

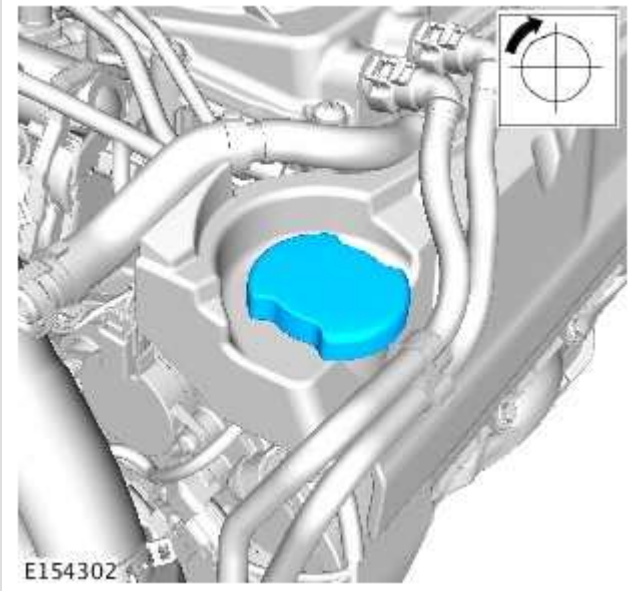
Refer to: Specifications (303-01A Engine - V6 S/C 3.0L Petrol, Specifications).

Refer to: Specifications (303-01B Engine - V8 S/C 5.0L Petrol, Specifications).

6.

CAUTION:

Correct installation of the oil filler cap can be obtained by tightening the cap until hard stop.



cardiagn.com

7. **CAUTION:**

Make sure that the vehicle has been left for 5 minutes from filling with oil.

Follow the Steps 9-13 before starting the engine.

8. Start the engine and allow to run for 10 minutes, stop the engine.

Check for leaks.

9. **CAUTIONS:**

Make sure that the vehicle is parked on level ground.

Make sure that the selector lever and the gearshift mechanism are in the park (P) position.

Make sure that the hood is open.

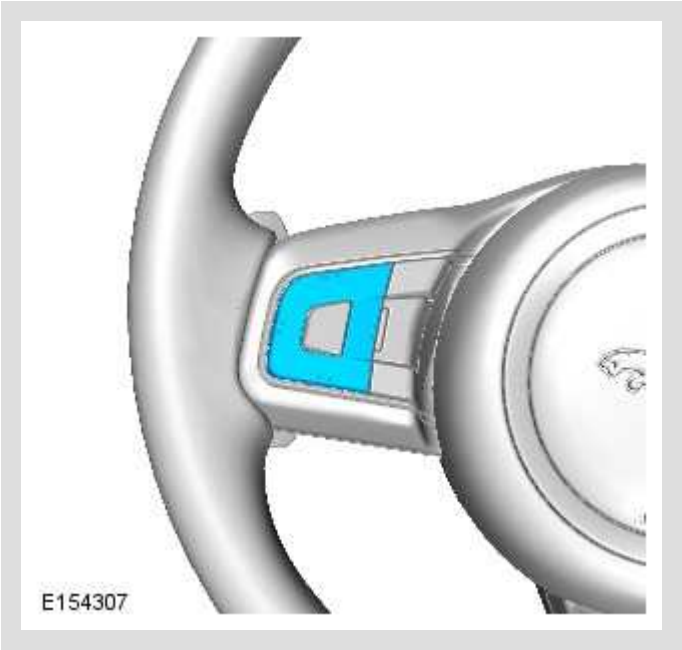
NOTE:

Allow 10 minutes from the engine switch off for the engine oil level to stabilize.

Turn the ignition on.

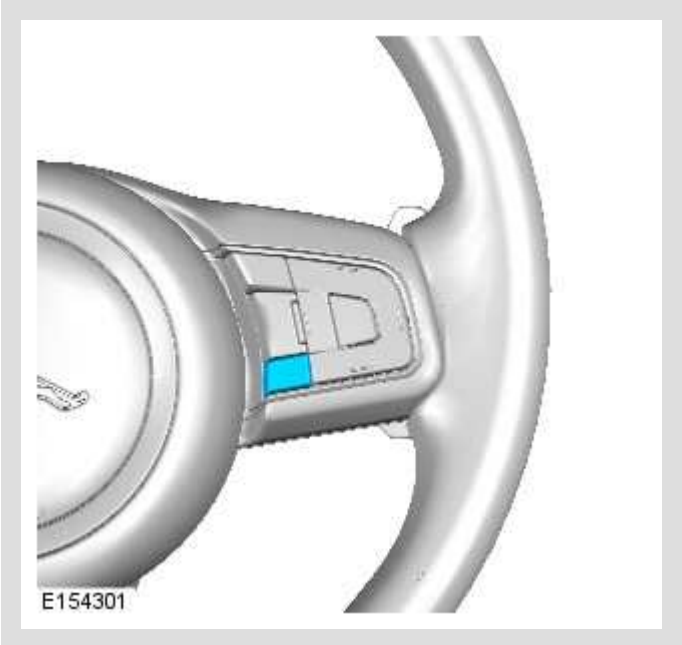
10.

cardiagn.com



Scroll through the message center to access the engine oil level display.

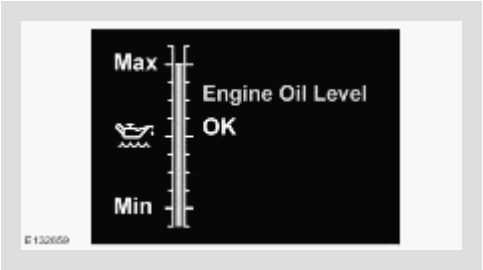
11.



Press the cruise control cancel button twice within 2 seconds.

12.

cardiagn.com



This display is now the live reading of the engine oil level.

Take a reading from the level display and, if necessary, top up with oil as instructed.

13. **NOTE:**

If instructed to follow Steps 9-13 in a previous step, return to Step 8 and continue the procedure.

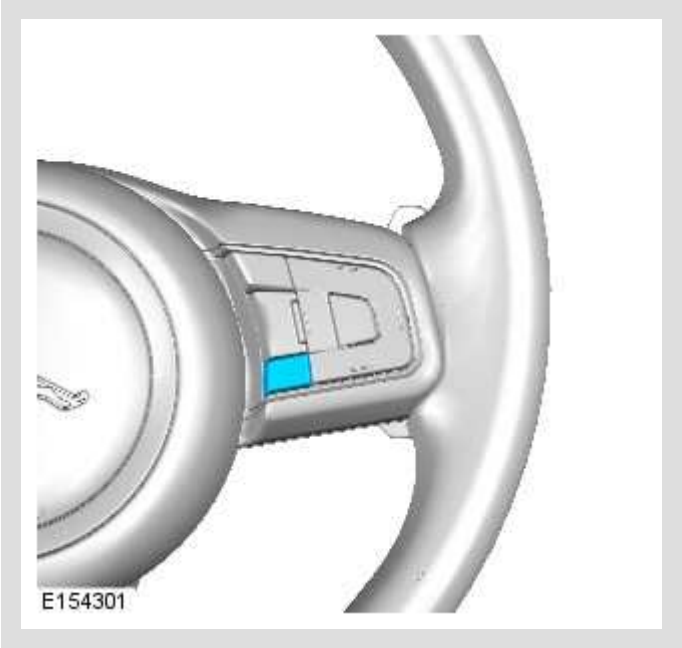
Turn the ignition off.

14. Allow 10 minutes for the engine oil level to stabilize if there has been additional oil top up.

15. **NOTE:**

The following steps are to update the average oil level value.

cardiagn.com



Turn the ignition on.

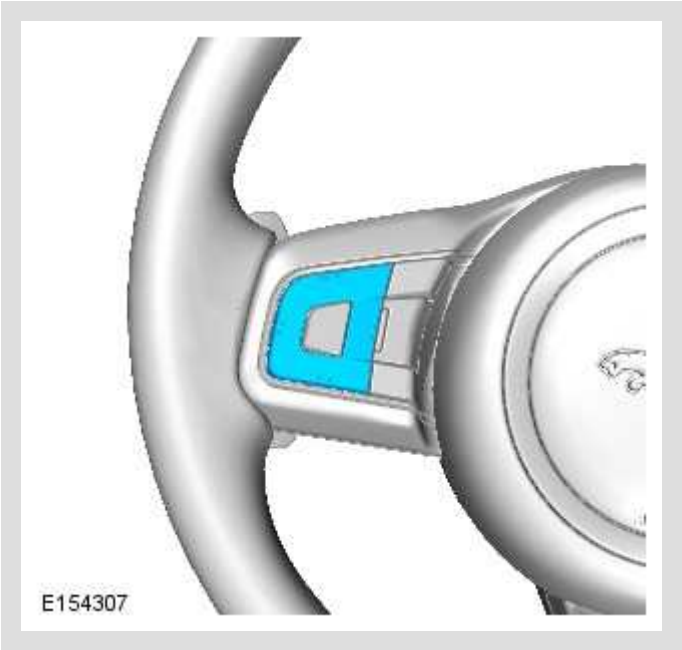
Press and hold the cruise control cancel button for more than 5 seconds.

16. Turn the ignition off.

17. Turn the ignition on.

18.

cardiagn.com



Scroll through the trip menu to access the engine oil level display.

Make sure that the average oil level value has now been updated.

19. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

cardiagn.com

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

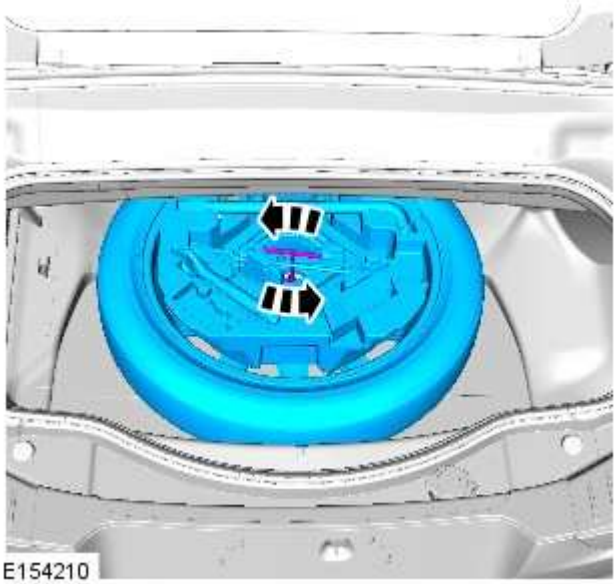
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

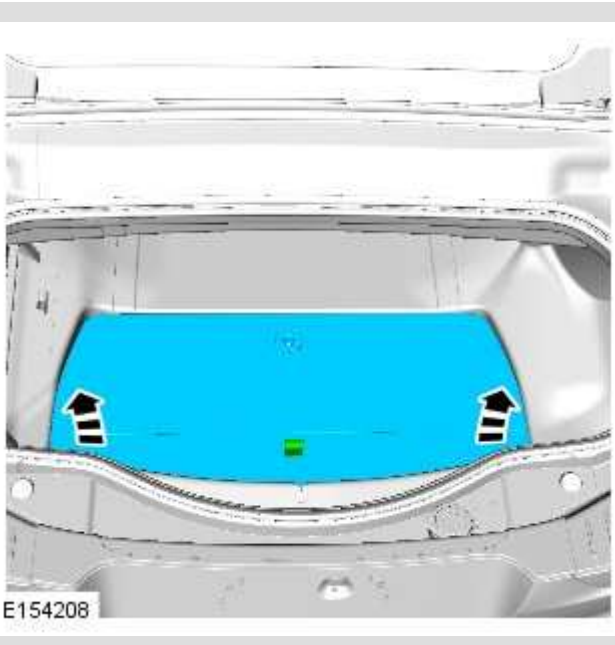
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

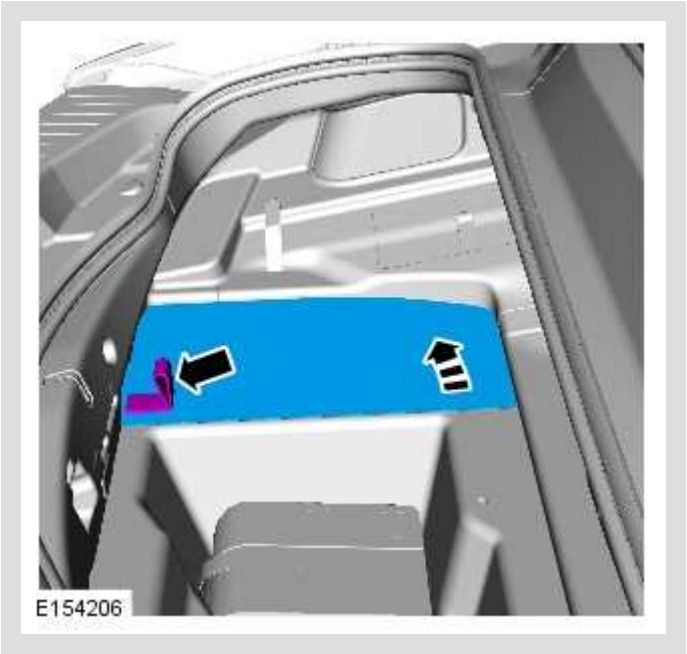


4.



cardiagn.com

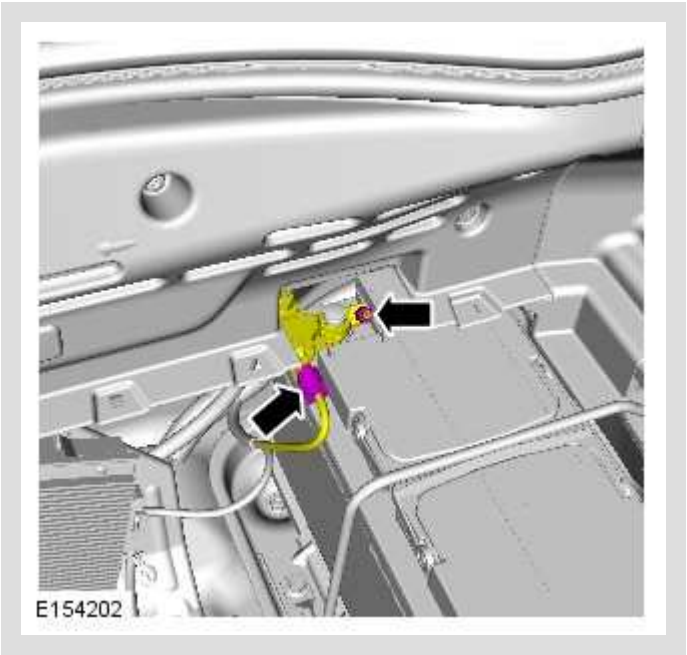
5.



6.

CAUTION:

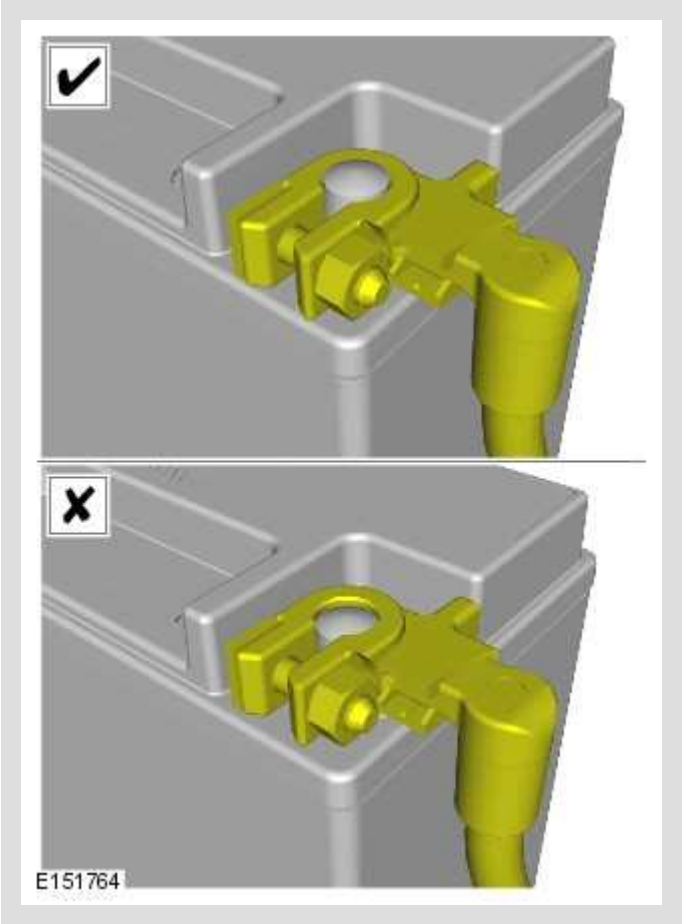
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

cardiagn.com

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

OIL PAN (G1774730)

REMOVAL AND INSTALLATION

12.60.44	OIL PAN - RENEW	ALL DERIVATIVES	0.8	USED WITHINS

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

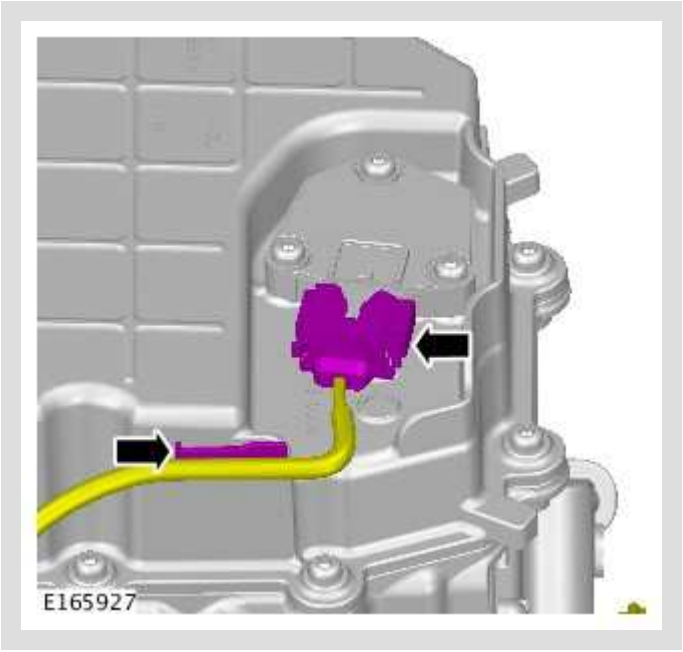
   Raise and support the vehicle.

3.

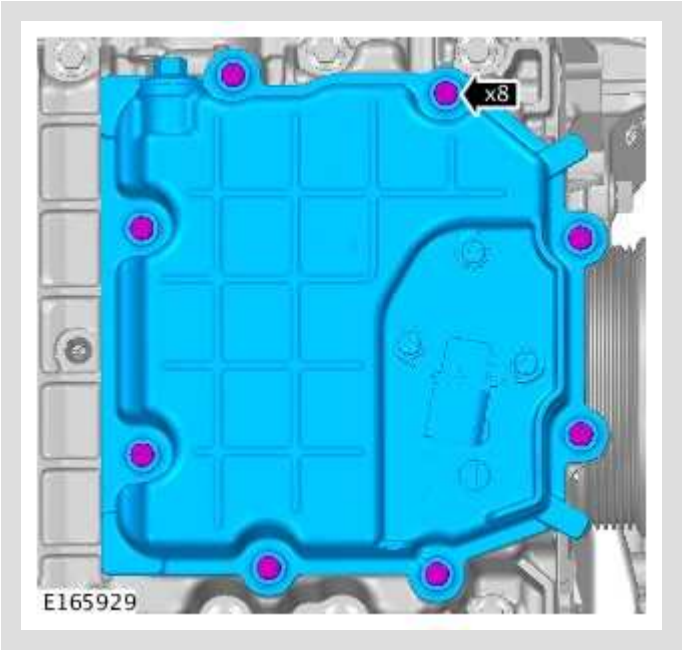
cardiagn.com

Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

4.



5.

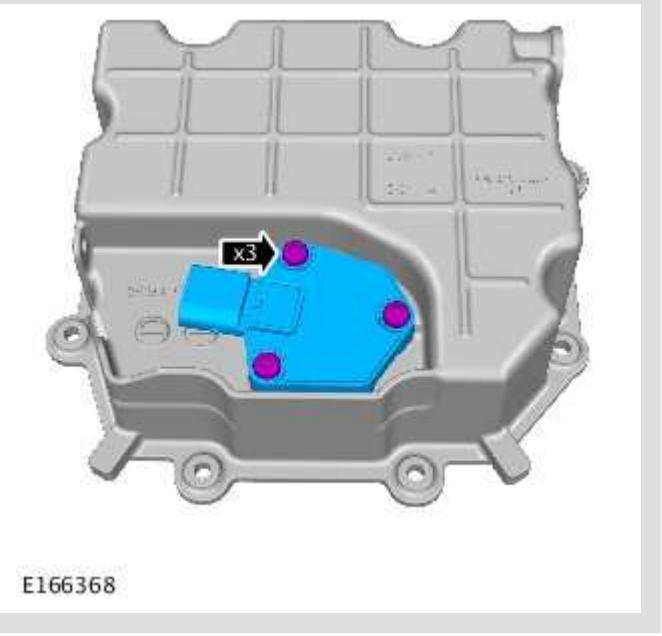


6.

NOTE:

Do not disassemble further if the component is removed for access only.

cardiagn.com

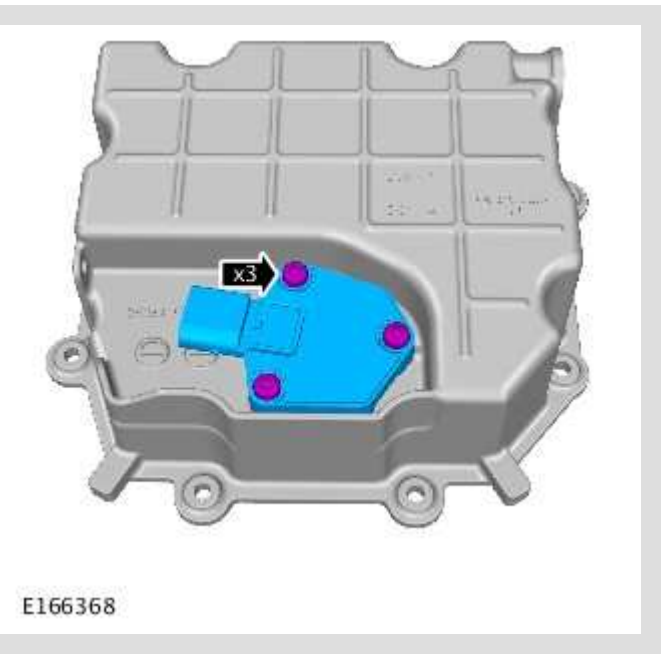


INSTALLATION

1.

NOTE:

Lubricate the seal with clean engine oil.



Torque: **12 Nm**

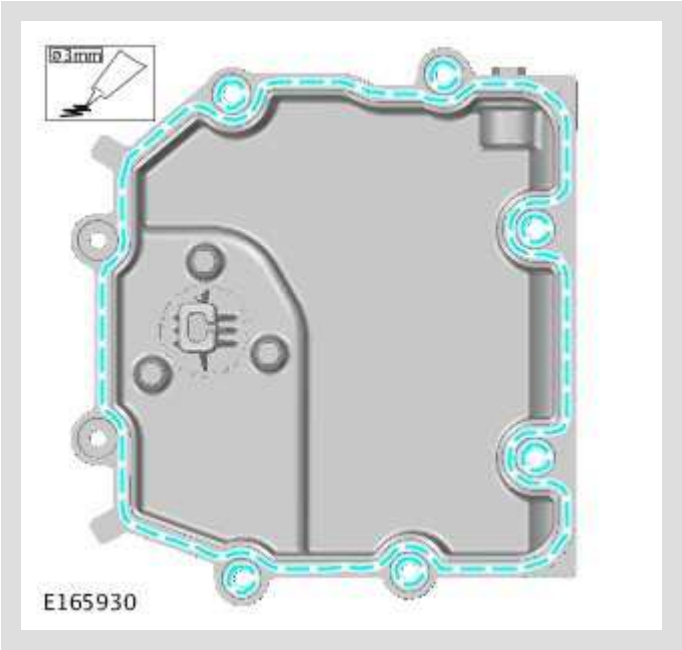
cardiagn.com

2.

CAUTIONS:

Make sure that the mating faces are clean and free of foreign material.

Use only a plastic scraper when removing the sealing material.



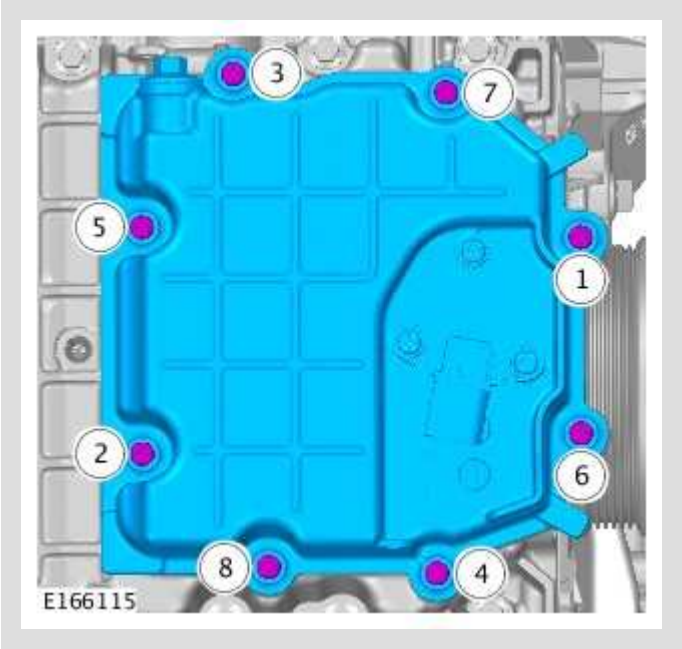
Apply RTV sealant (Loctite 5901G) in a 2-3mm diameter to the areas shown, and tighten the bolts within 7 minutes.

3.

NOTE:

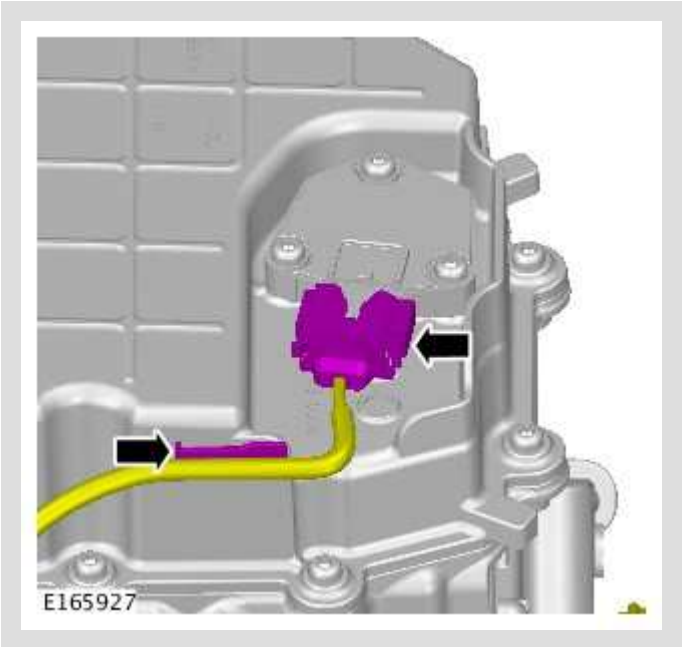
Tighten the bolts in the indicated sequence.

cardiagn.com



Torque: **12 Nm**

4.



5. Refer to: Engine Oil Draining and Filling (303-01A Engine - V6 S/C 3.0L Petrol, General Procedures).

cardiagn.com

6. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

ENGINE OIL DRAINING AND FILLING (G1586896)

GENERAL PROCEDURES

12.60.07	ENGINE OIL - DRAIN AND REFILL	ALL DERIVATIVES	0.5	USED WITHINS

DRAINING

WARNING:

The spilling of hot engine oil is unavoidable during this procedure, care must be taken to prevent scalding.

NOTES:

- Clean the components general area prior to dismantling.
- Some variation in the illustrations may occur, but the essential information is always correct.

cardiagn.com

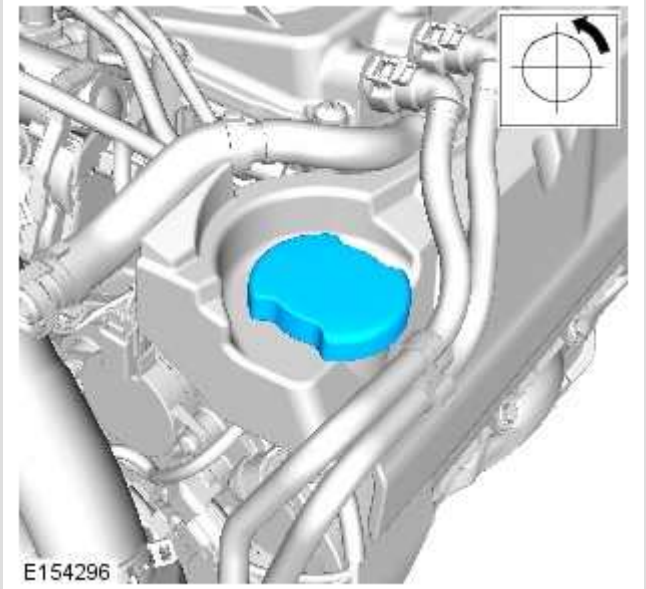
1.

CAUTION:

Make sure the engine is warm.

Start the engine and allow to run for 10 minutes, stop the engine.

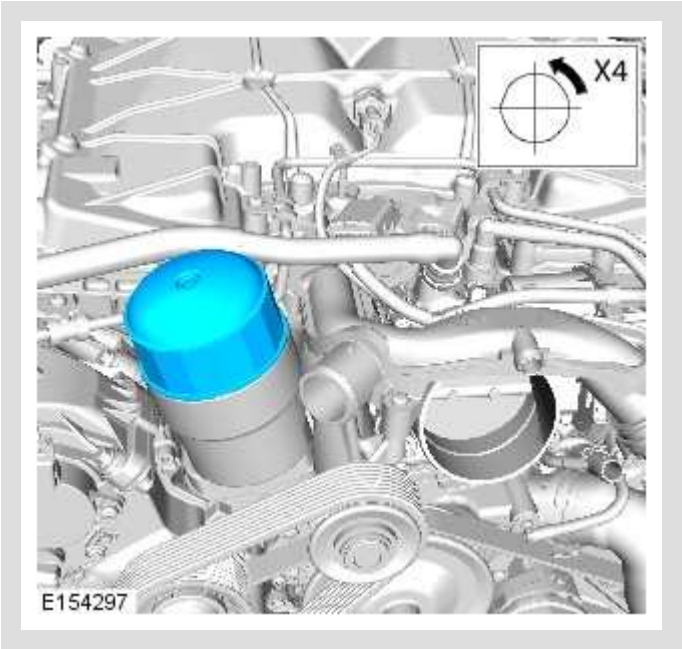
2.



3. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

4.

cardiagn.com



Loosen the element cover 4 complete turns to allow engine oil to drain from the filter cover.

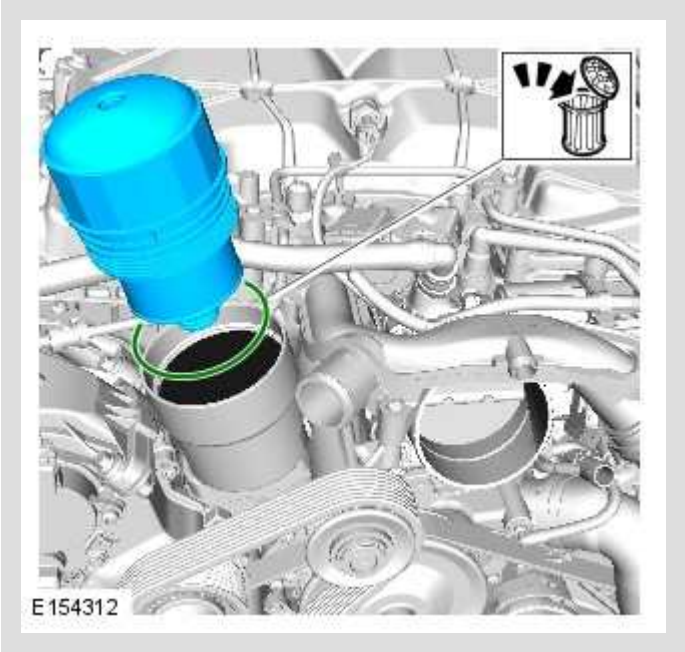
Make sure that the O-ring seal is exposed.

5.

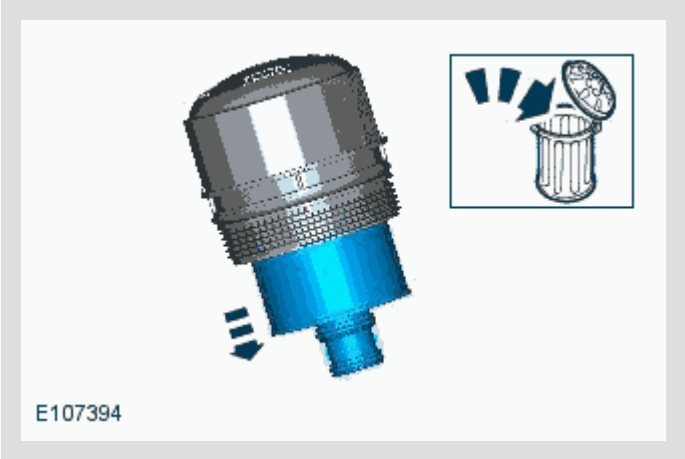
NOTES:

- Allow 10 minutes for the engine oil to drain from the oil filter housing.
- Remove and discard the O-ring seal.
- Position cloth to collect fluid spillage, make sure fluid does not come in to contact with the accessory drive belts.

cardiagn.com



6.



Remove and discard the oil filter element.

7.

WARNING:

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

8. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

9.

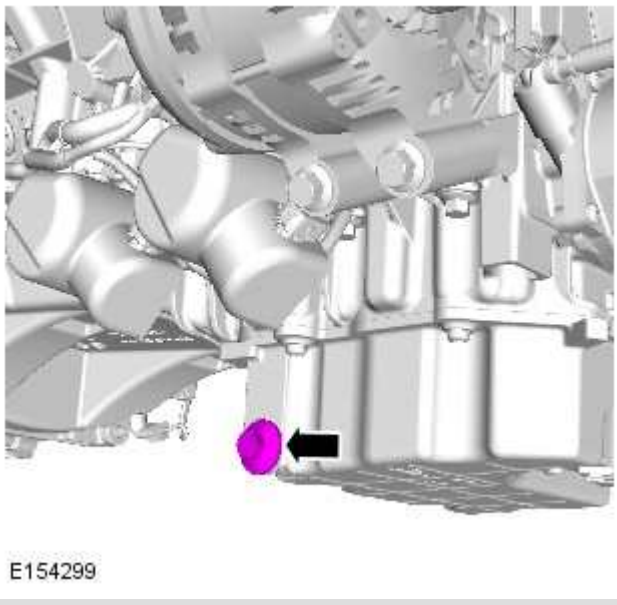
cardiagn.com

CAUTIONS:

- Be prepared to collect escaping oil.
- Allow at least 10 minutes for the engine oil to drain.

NOTE:

Discard the oil pan drain plug.



FILLING

1.

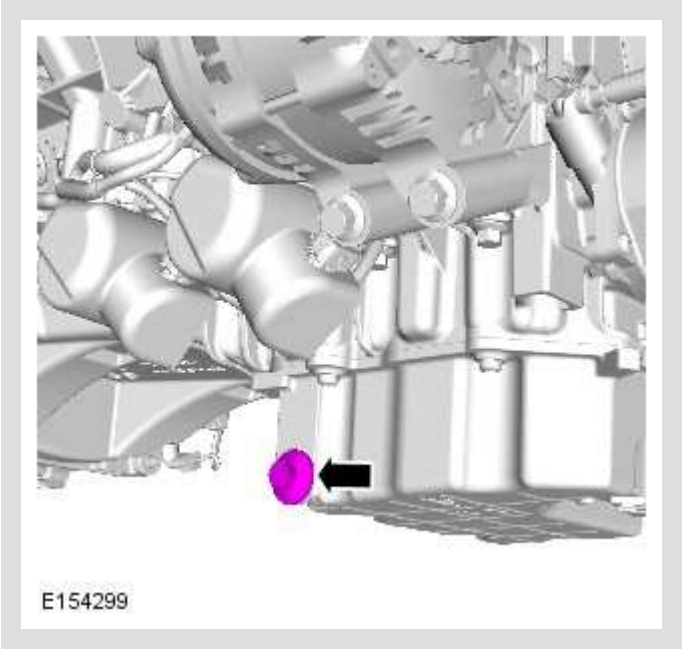
CAUTION:

Make sure that the area around the component is clean and free of foreign material.

NOTE:

Install a new oil pan drain plug.

cardiagn.com

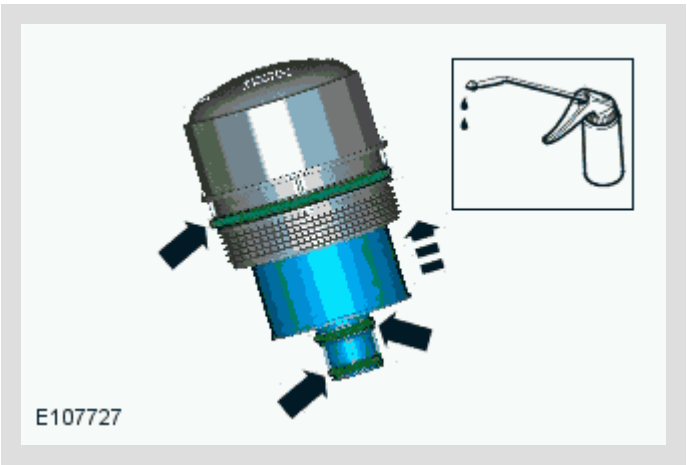


Torque: **24 Nm**

2. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

3. **NOTE:**

Install new O-ring seals.

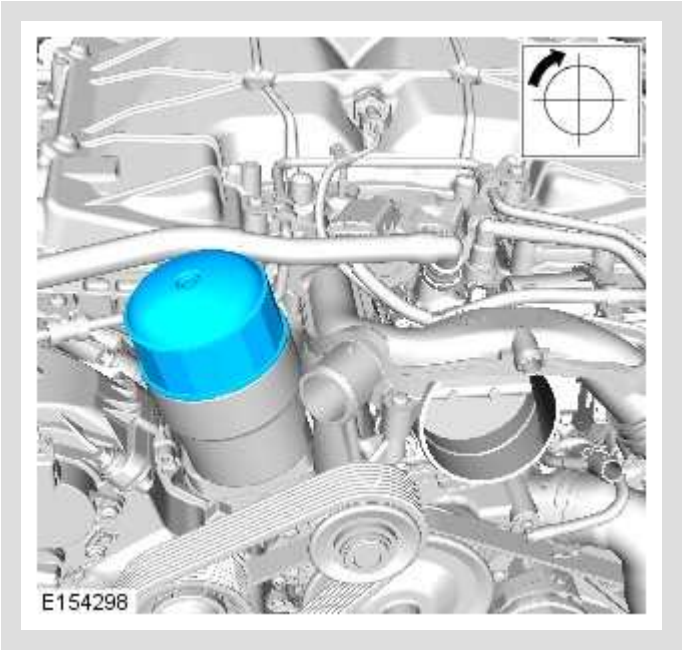


Lubricate the oil filter element O-ring seal with clean engine oil.

4. **CAUTION:**

cardiagn.com

Tighten the component finger tight first.



Torque: **25 Nm**

5.

CAUTION:

Make sure that the vehicle is left for 5 minutes from filling with oil and that the engine oil level is reading at least minimum, before starting the engine. To check engine oil level follow steps 9-13.

Fill the engine with oil.

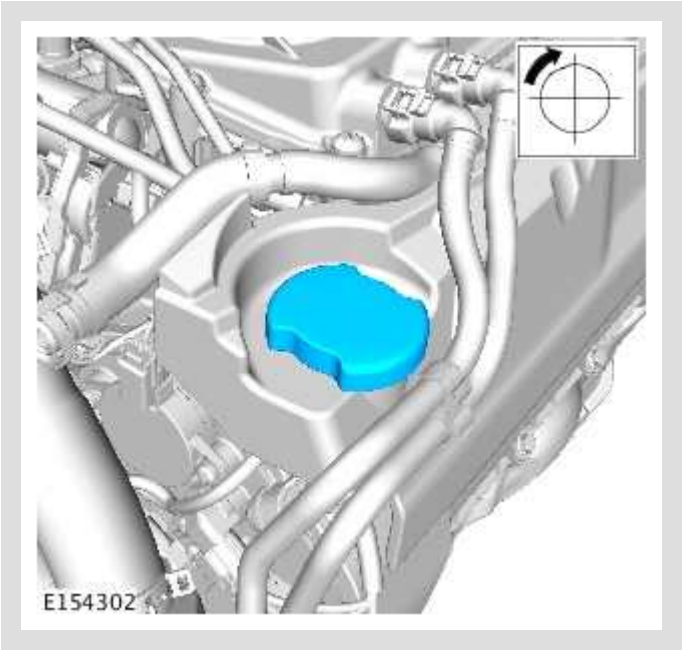
Clean any residual engine oil from the oil filler cap area.
Refer to: Specifications (303-01A Engine - V6 S/C 3.0L Petrol, Specifications).
Refer to: Specifications (303-01B Engine - V8 S/C 5.0L Petrol, Specifications).

6.

CAUTION:

cardiagn.com

Correct installation of the oil filler cap can be obtained by tightening the cap until hard stop.



7.

CAUTION:

Make sure that the vehicle has been left for 5 minutes from filling with oil.

Follow the Steps 9-13 before starting the engine.

8.

Start the engine and allow to run for 10 minutes, stop the engine.

Check for leaks.

9.

CAUTIONS:

Make sure that the vehicle is parked on level ground.

cardiagn.com

Make sure that the selector lever and the gearshift mechanism are in the park (P) position.

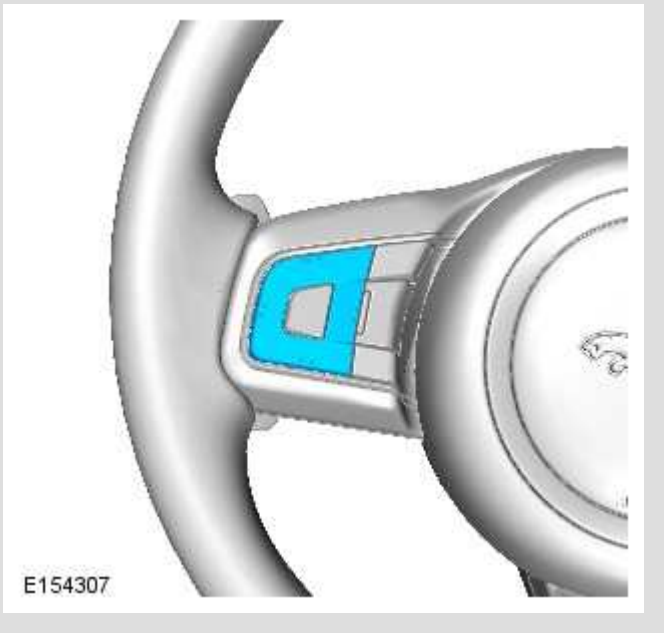
Make sure that the hood is open.

NOTE:

Allow 10 minutes from the engine switch off for the engine oil level to stabilize.

Turn the ignition on.

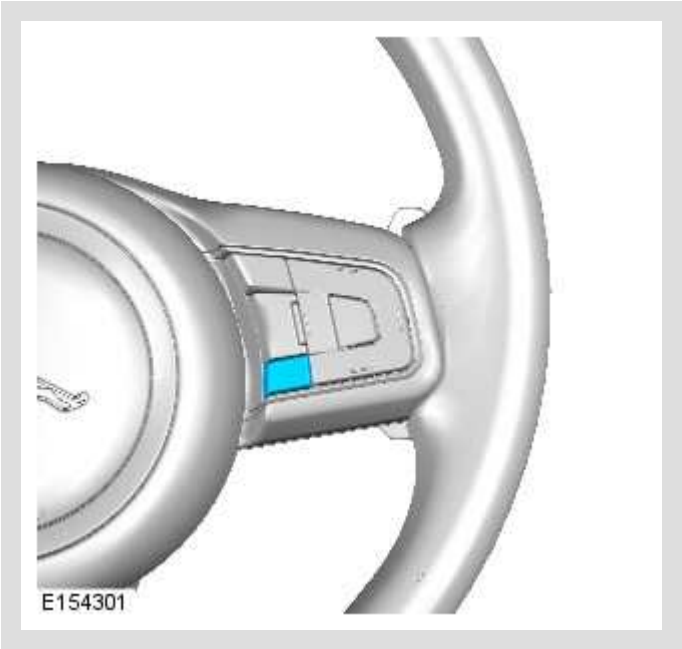
10.



Scroll through the message center to access the engine oil level display.

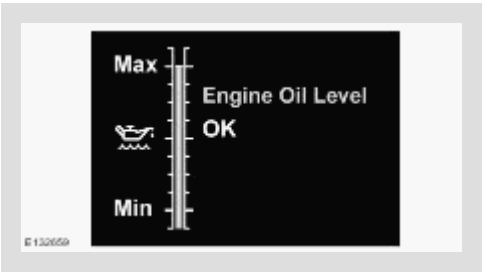
11.

cardiagn.com



Press the cruise control cancel button twice within 2 seconds.

12.



This display is now the live reading of the engine oil level.

Take a reading from the level display and, if necessary, top up with oil as instructed.

13.

NOTE:

cardiagn.com

If instructed to follow Steps 9-13 in a previous step, return to Step 8 and continue the procedure.

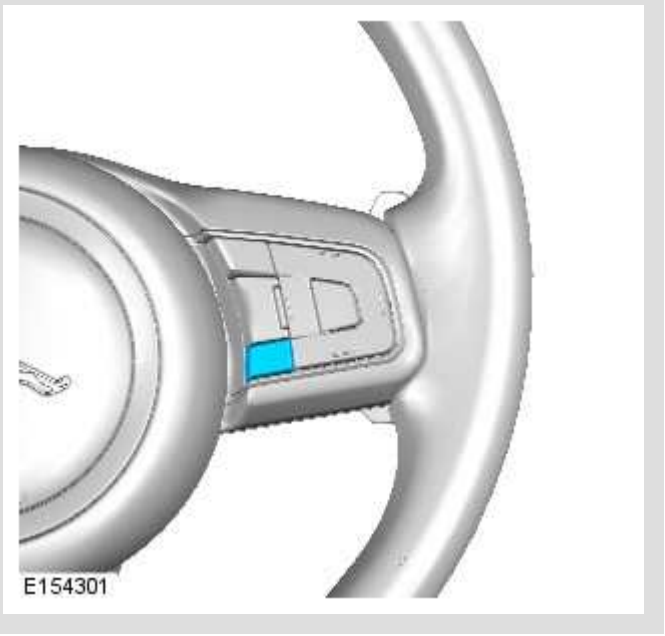
Turn the ignition off.

14. Allow 10 minutes for the engine oil level to stabilize if there has been additional oil top up.

15.

NOTE:

The following steps are to update the average oil level value.



Turn the ignition on.

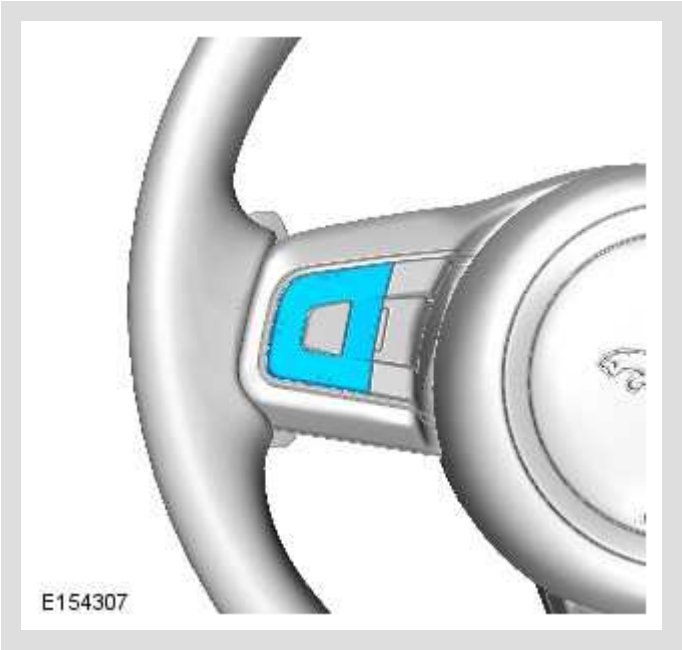
Press and hold the cruise control cancel button for more than 5 seconds.

16. Turn the ignition off.

17. Turn the ignition on.

cardiagn.com

18.



Scroll through the trip menu to access the engine oil level display.

Make sure that the average oil level value has now been updated.

19. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

cardiagn.com

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

BATTERY

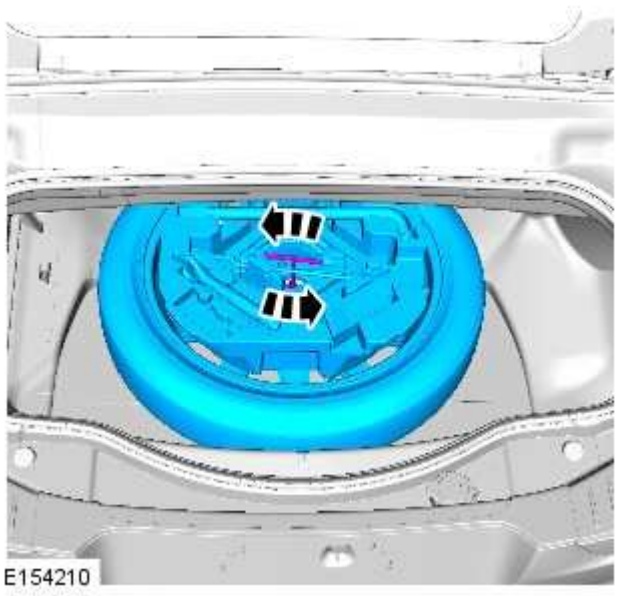
86.15.15	DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

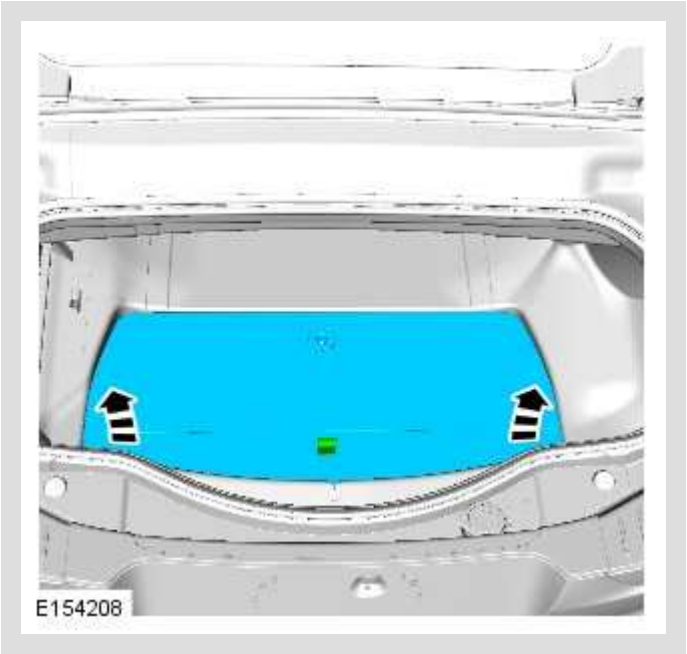
1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

2. Obtain and record the audio unit preset radio frequencies.

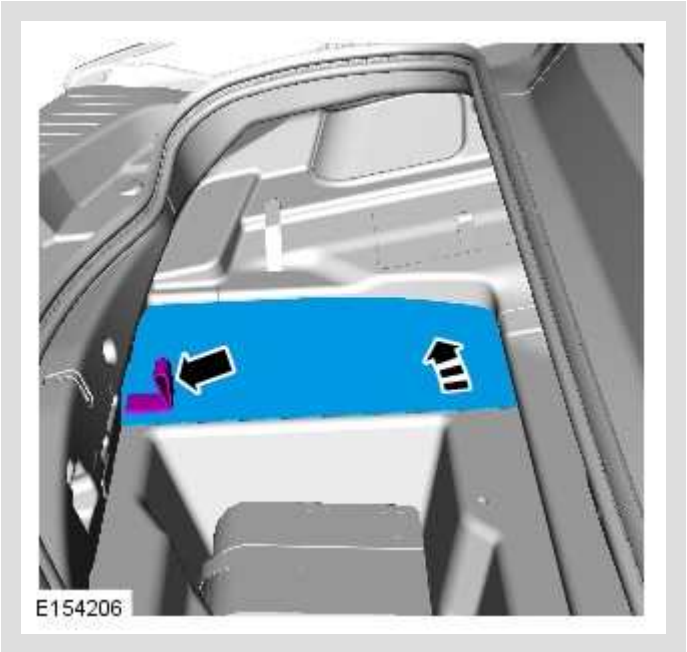
3. 

4.

cardiagn.com



5.

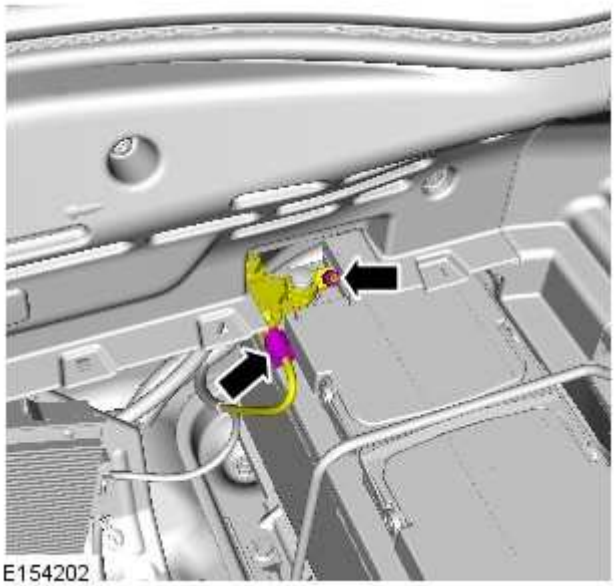


6.

CAUTION:

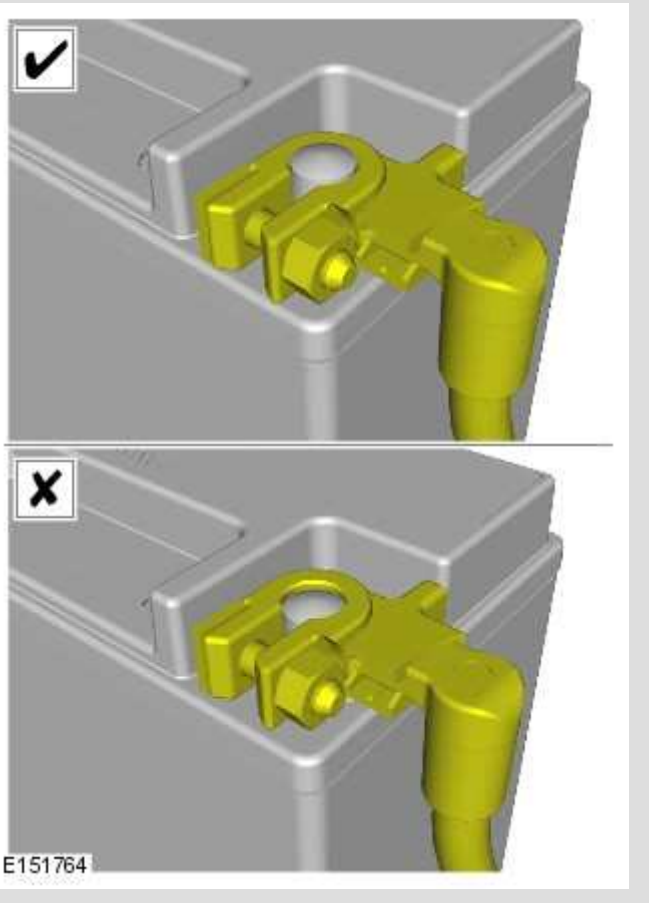
Take extra care not to damage the wiring harnesses.

cardiagn.com



Torque: **6 Nm**

7.



8. To install, reverse the removal procedure.

cardiagn.com

9. **NOTE:**

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

REAR DYNAMIC BALANCER (G1716223)

REMOVAL AND INSTALLATION

12.49.20	DYNAMIC BALANCER - REAR - RENEW	3000 CC, AJ V6 (AJ126)	15.4	USED WITHINS	

REMOVAL

NOTES:

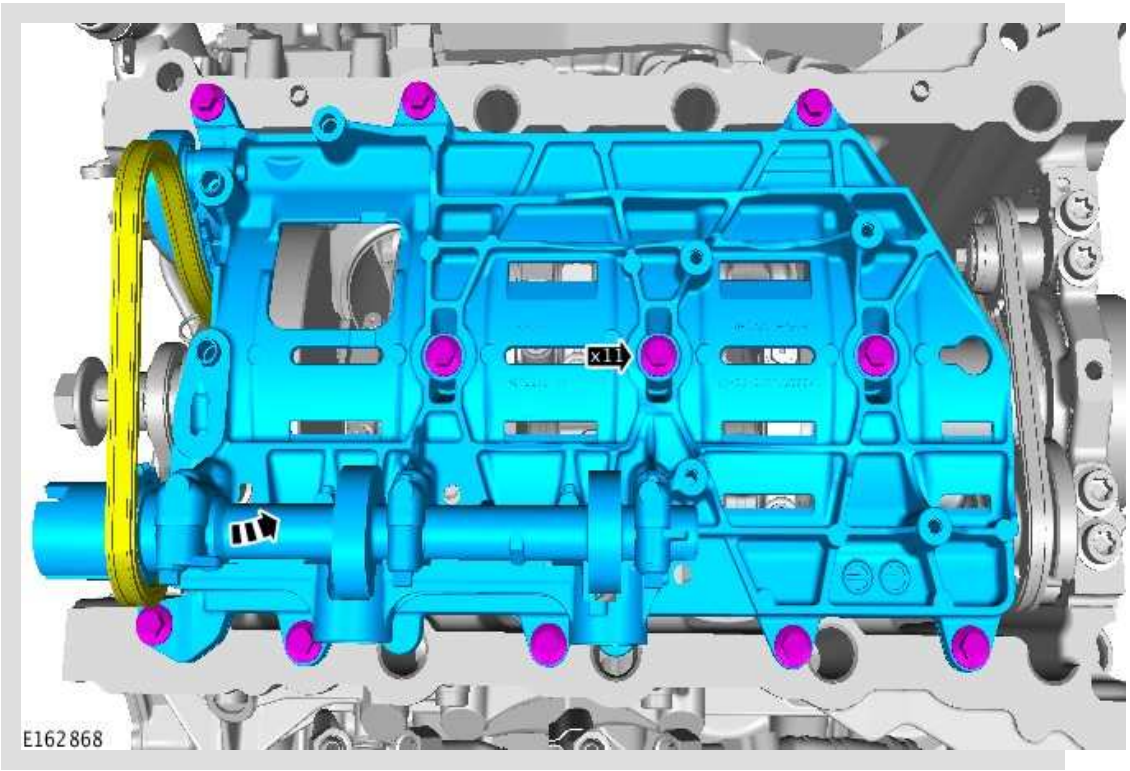
- Removal steps in this procedure may contain installation details.
- Some components shown removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Electric Oil Pump (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

3.

cardiagn.com

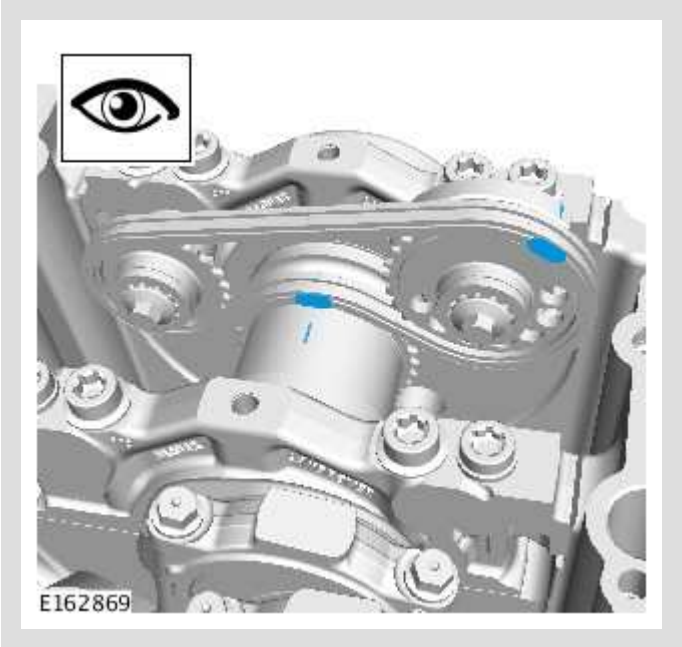


4.

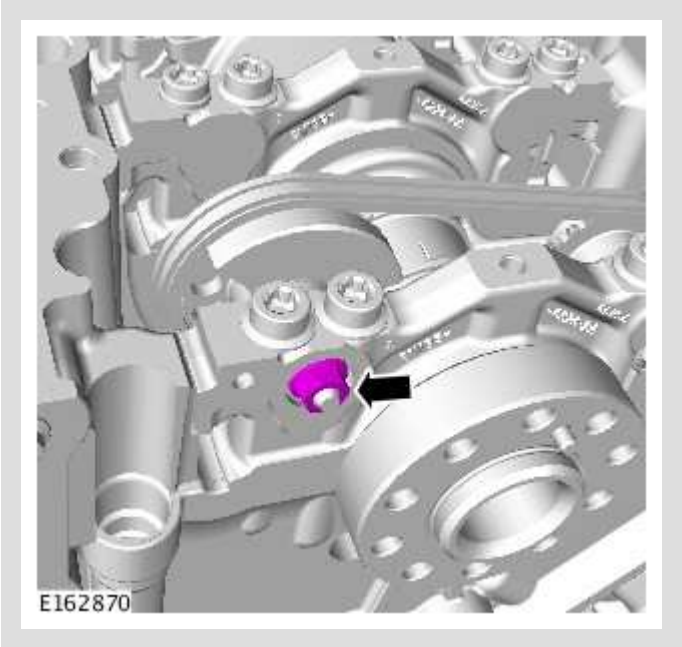
CAUTION:

Make sure the timing marks are aligned.

cardiagn.com

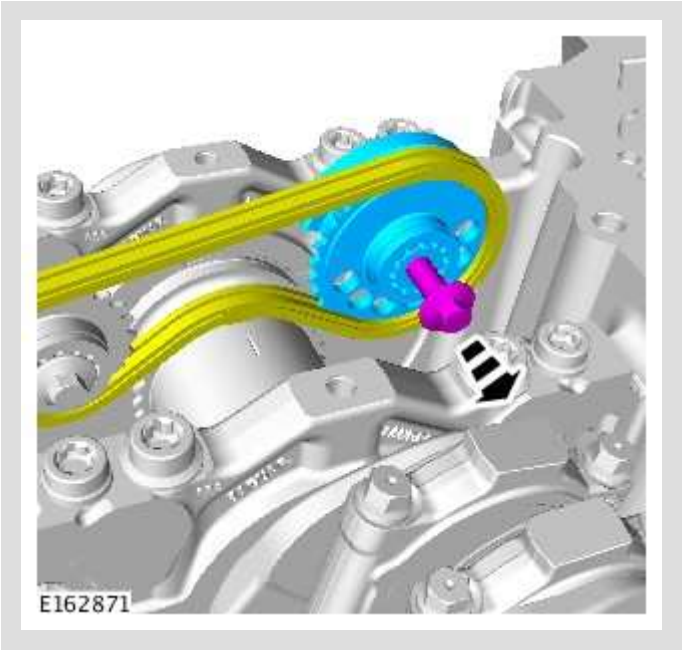


5.



6.

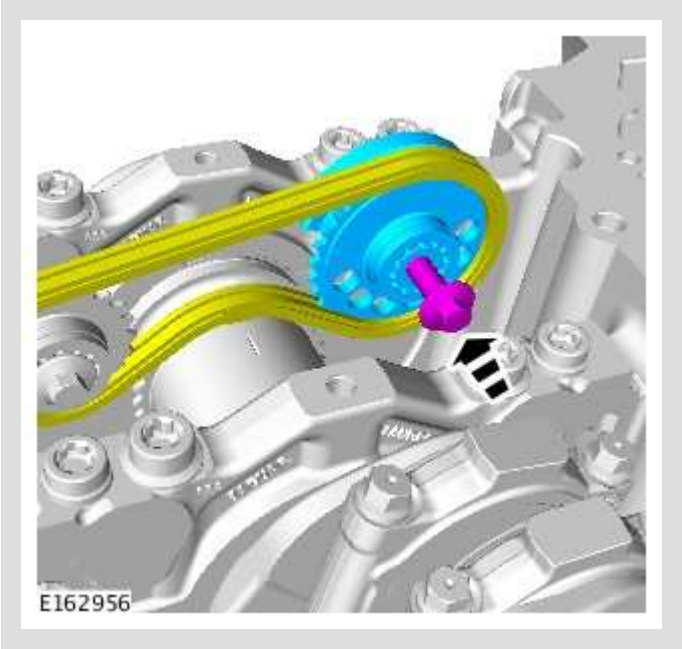
cardiagn.com



INSTALLATION

1.

cardiagn.com

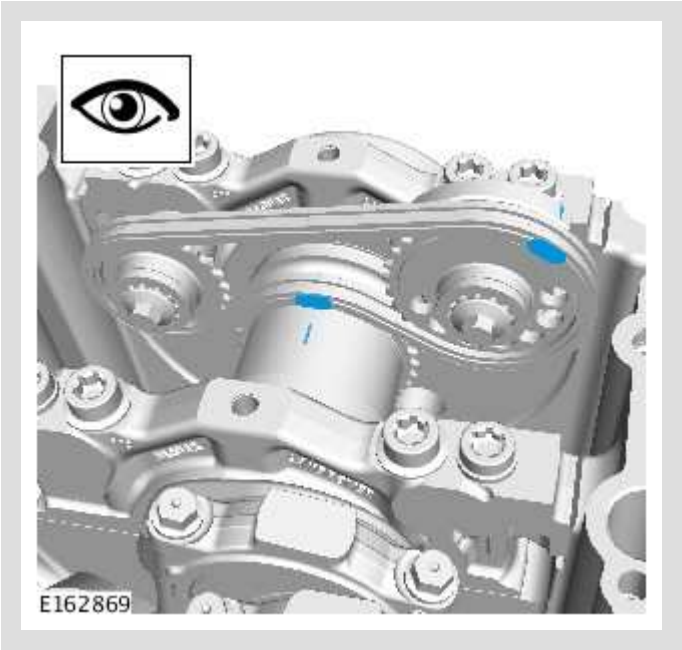


2.

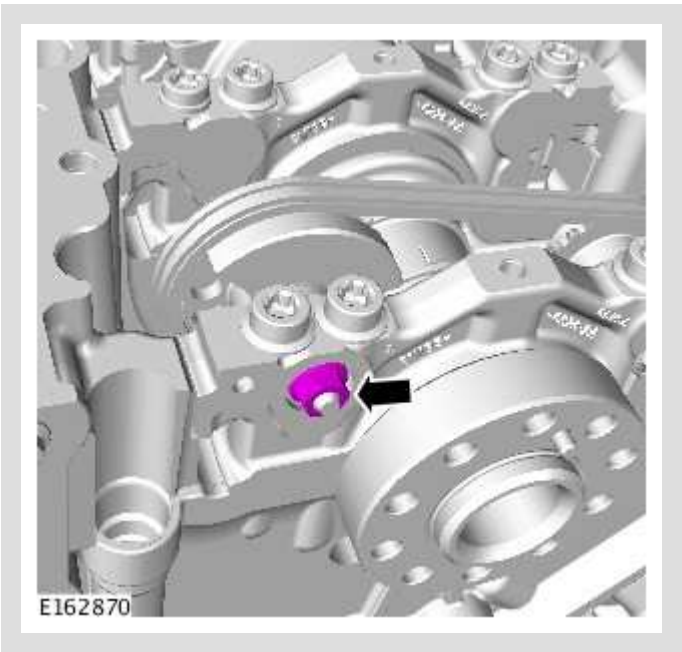
CAUTION:

Make sure the timing marks are aligned.

cardiagn.com



3.



Torque:

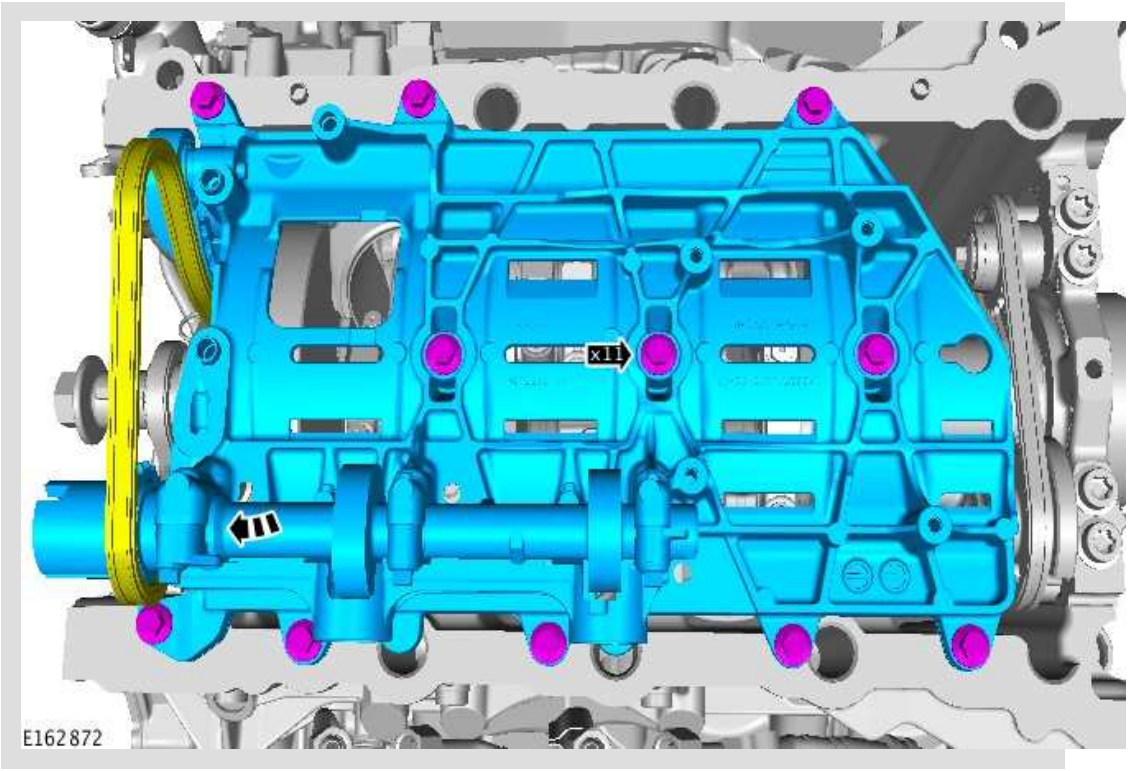
Stage 1: **25 Nm**

cardiagn.com

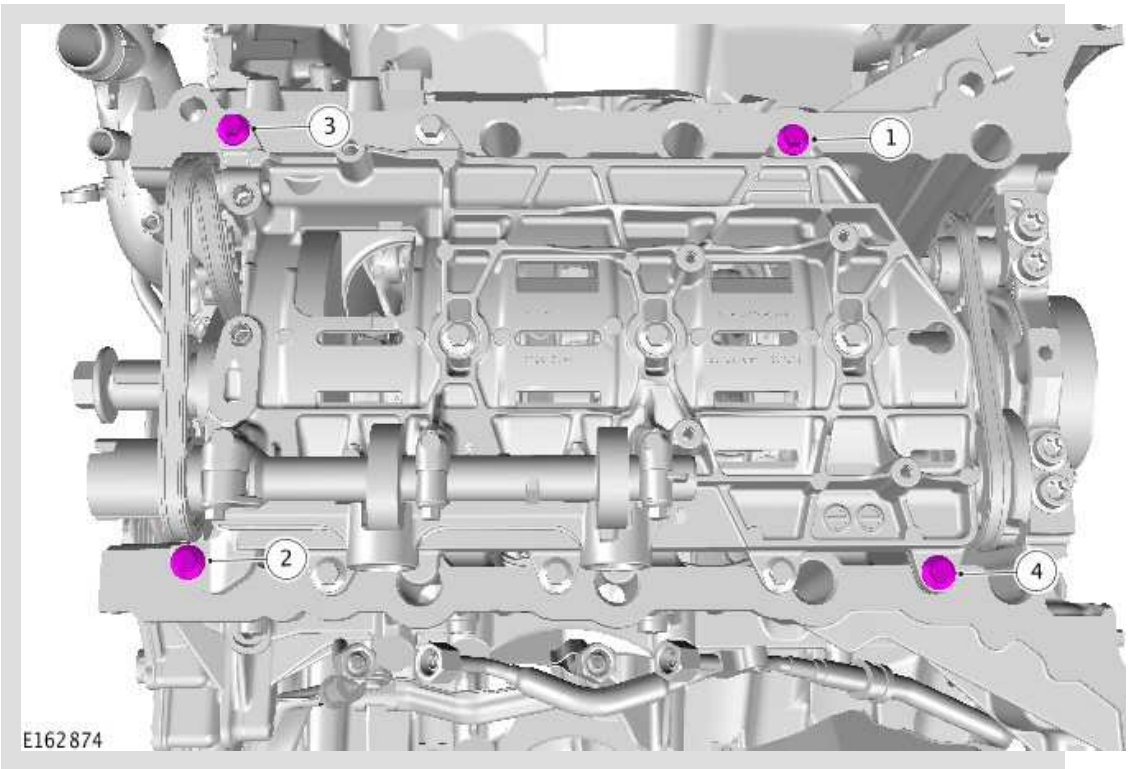
4.

CAUTION:

Install all the bolts finger tight before final tightening.



5.

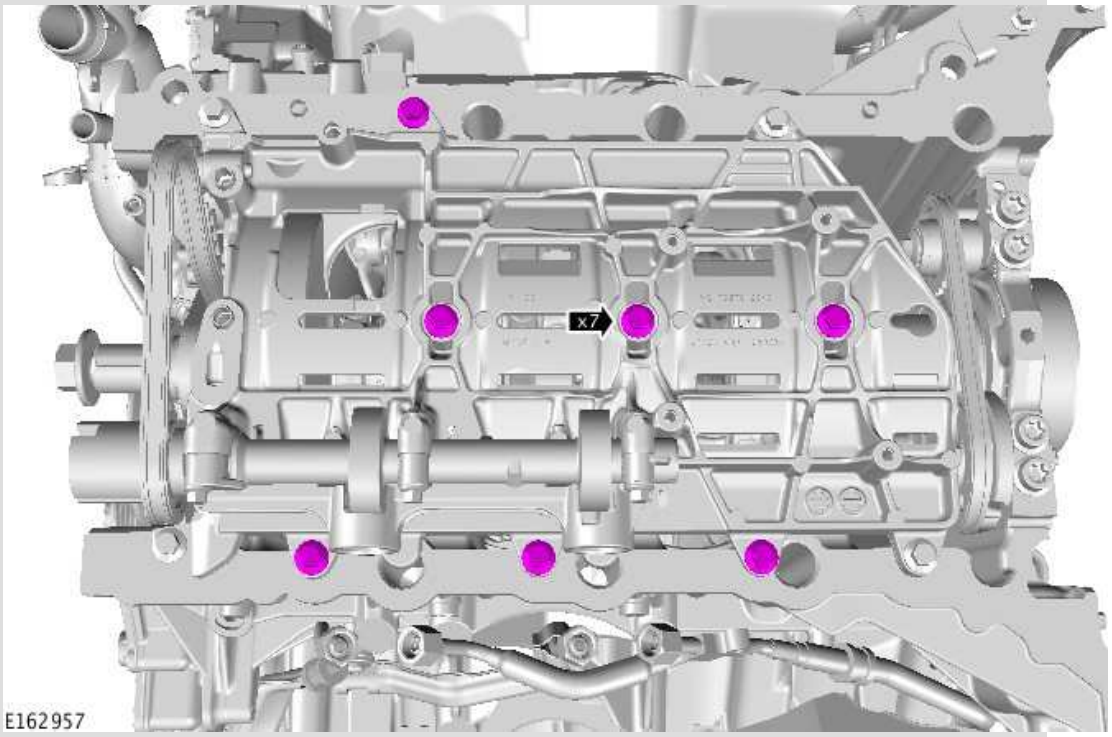


Tighten bolts in the sequence shown.

cardiagn.com

Torque: **25 Nm**

6.



Tighten remaining bolts.

Torque: **25 Nm**

7. Refer to: Electric Oil Pump (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

8. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

ELECTRIC OIL PUMP (G1774732)

REMOVAL AND INSTALLATION

12.60.26	OIL PUMP - RENEW	3000 CC, AJ V6 (AJ126)	13.9	USED WITHINS	

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

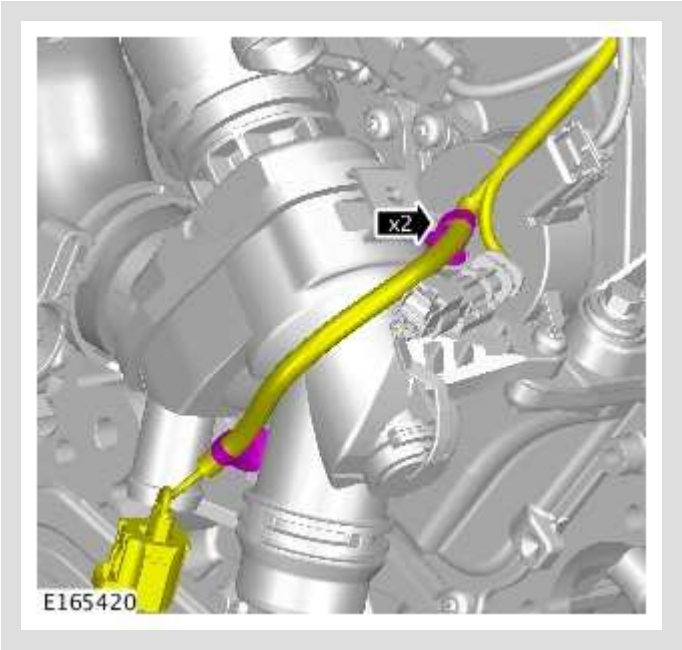
   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

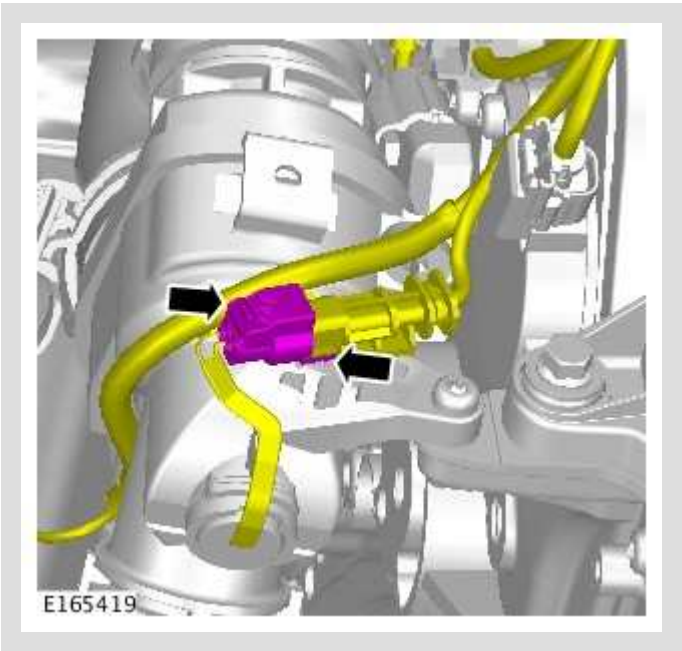
3. Refer to: Oil Pan Extension (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Oil Pan (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

4.

cardiagn.com

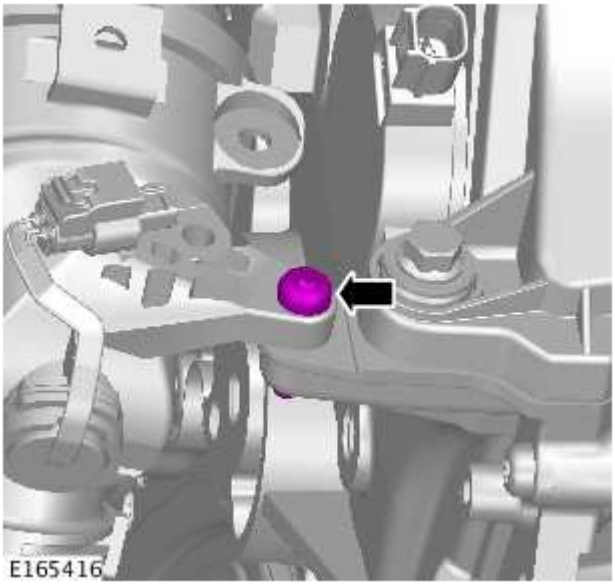


5.

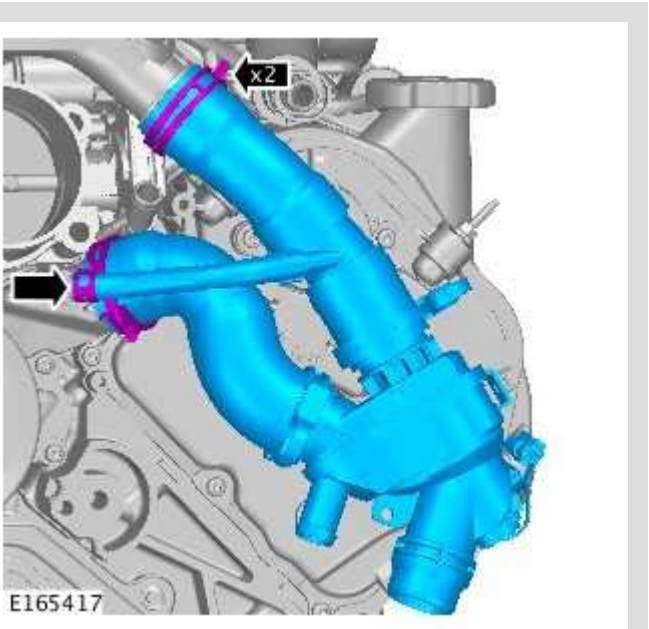


6.

cardiagn.com

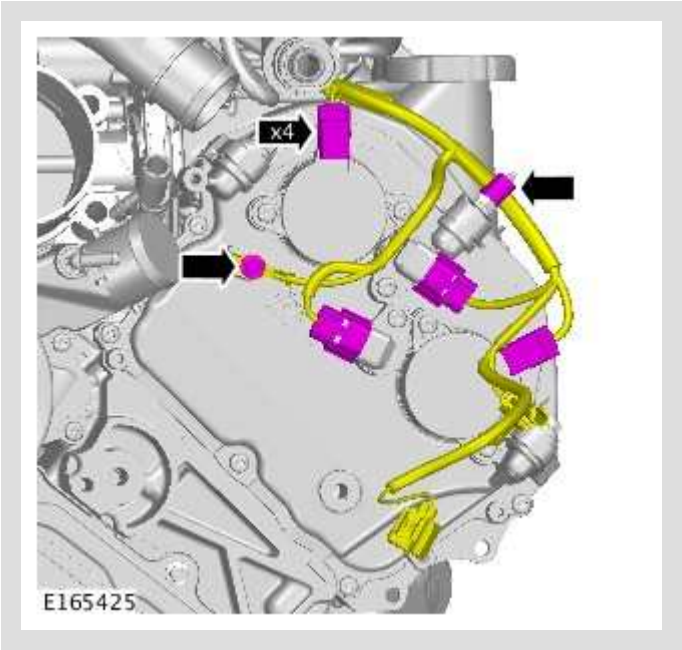


7.

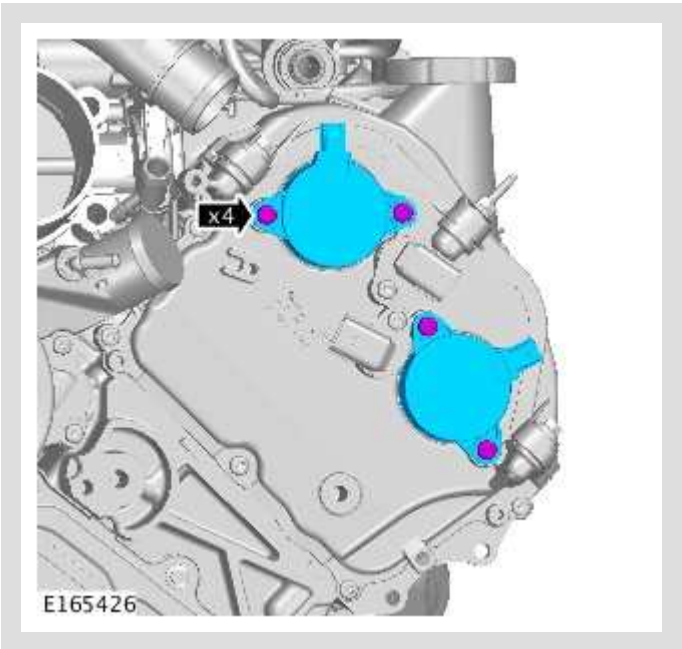


8.

cardiagn.com

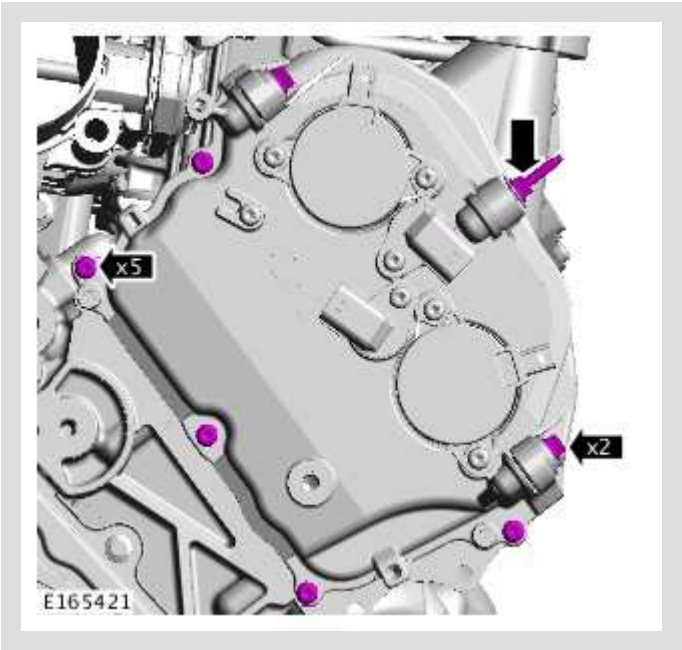


9.



10.

cardiagn.com



11.

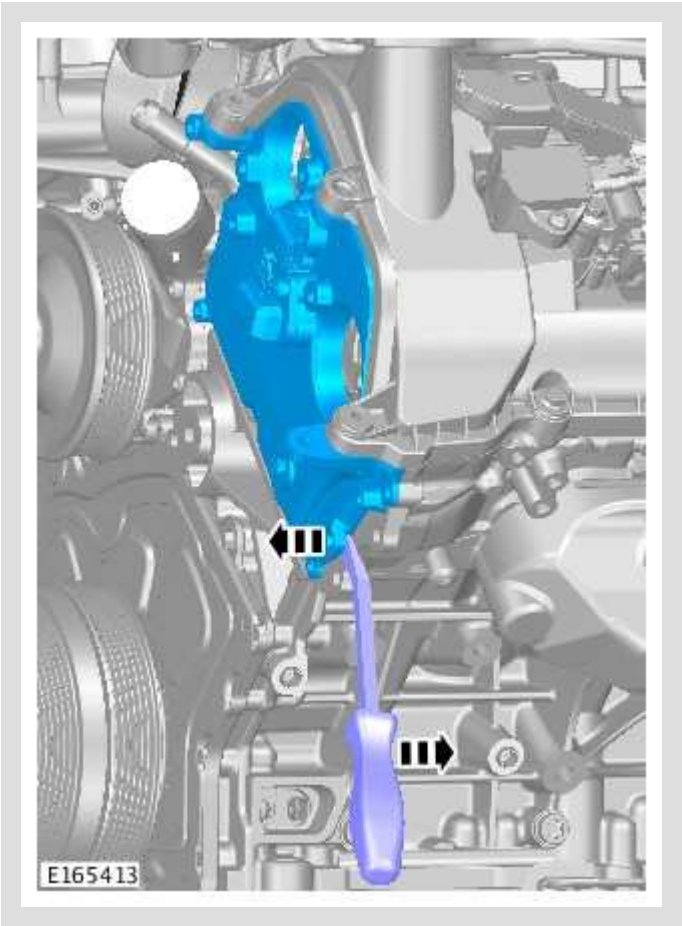
CAUTION:

Take extra care not to damage the component.

NOTE:

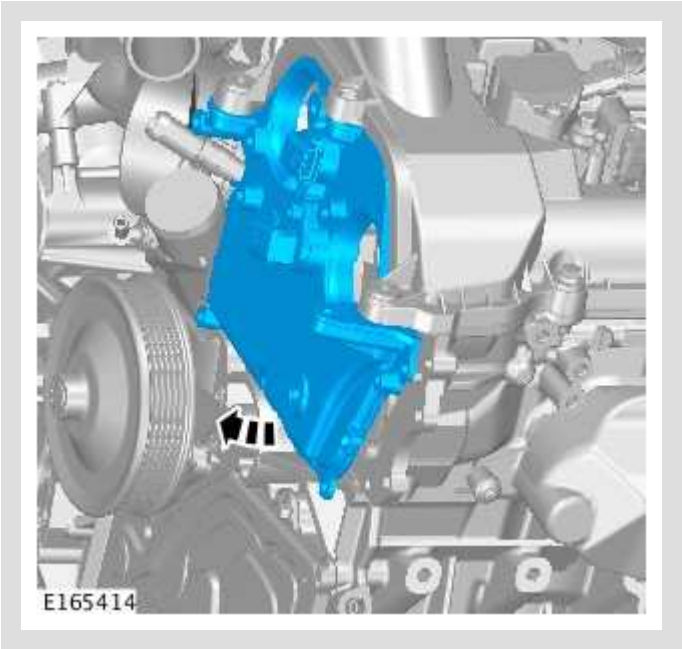
Make sure to use the aluminium lug provided on the timing cover to lever against.

cardiagn.com



12.

cardiagn.com

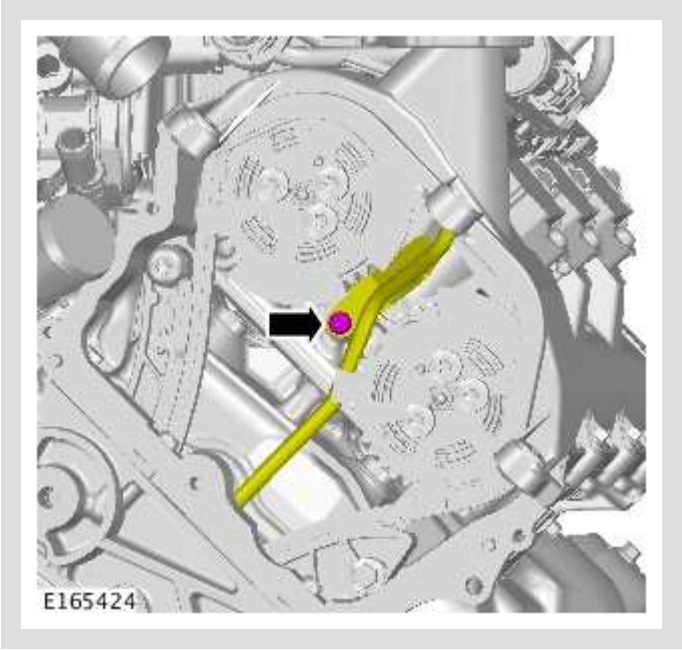


13.

CAUTION:

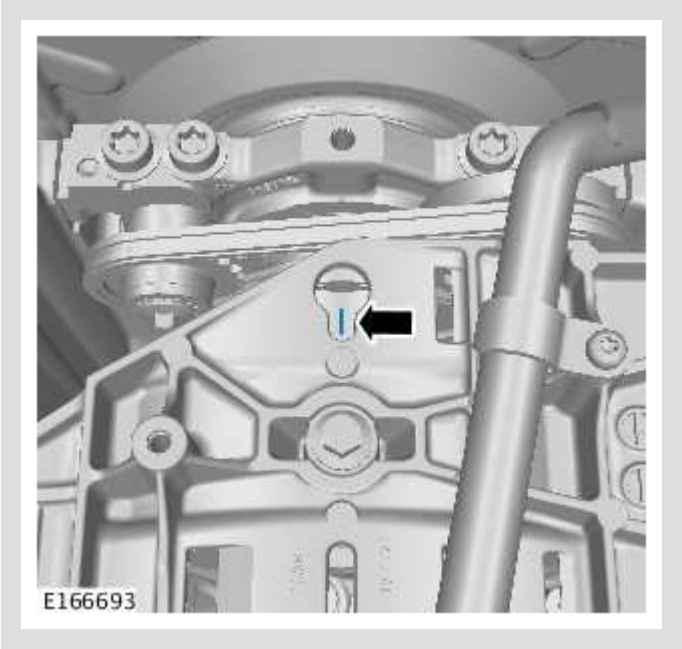
Take extra care not to drop the bolt.

cardiagn.com



Hold the bolt with a magnet to prevent it from dropping.

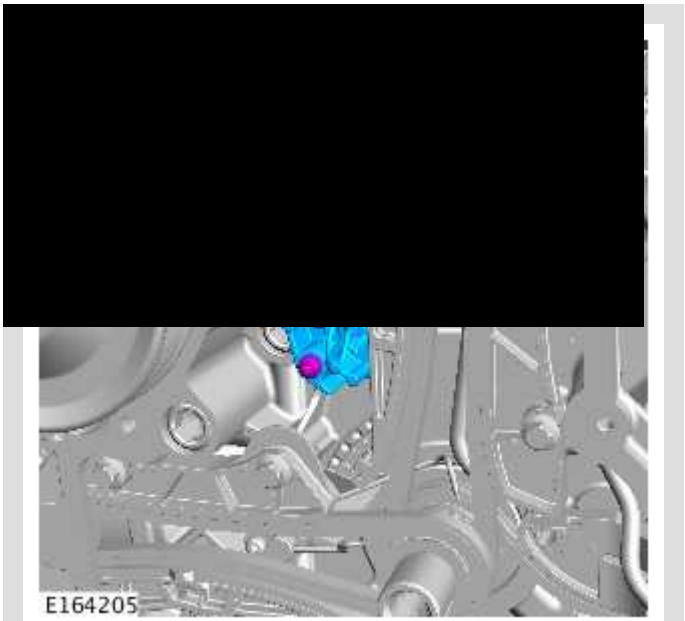
14.



Make sure the crankshaft is at the timed position.

cardiagn.com

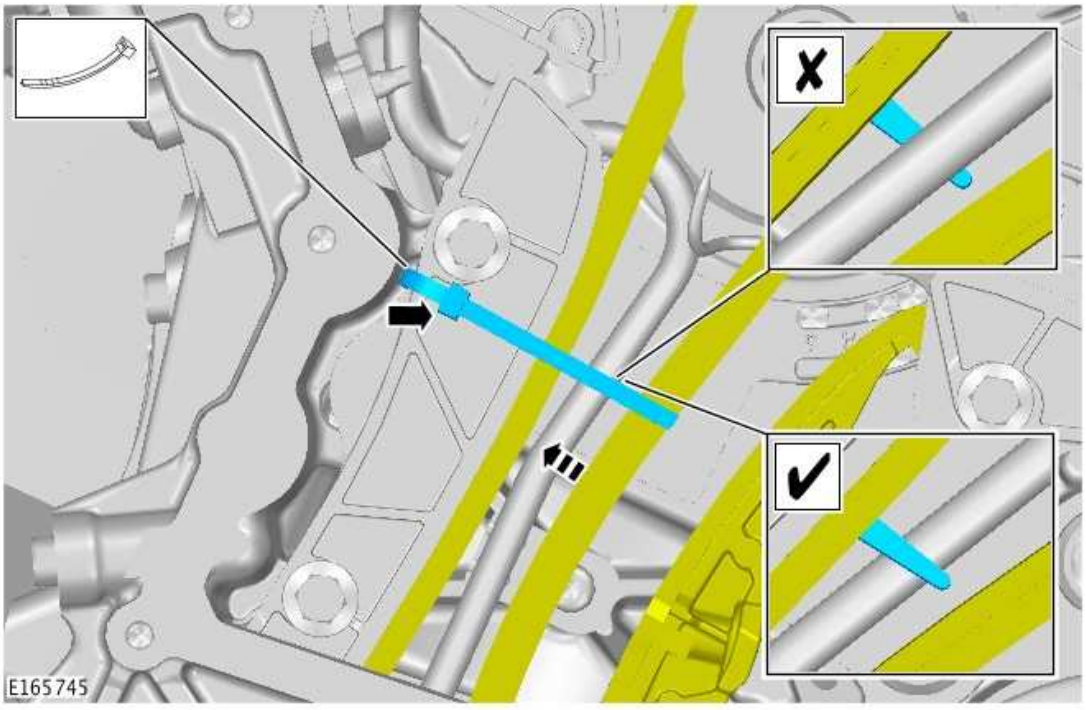
15.



16.

CAUTION:

Using a tie strap, make sure the tension is maintained on the timing chain.



cardiagn.com

17.

CAUTION:

Use only a long torx socket or torx driver. Do not use a small torx socket, as it may damage the timing chain.

Hold the bolt with a magnet to prevent it from dropping.

18.

CAUTION:

Take extra care not to damage the oil jet.

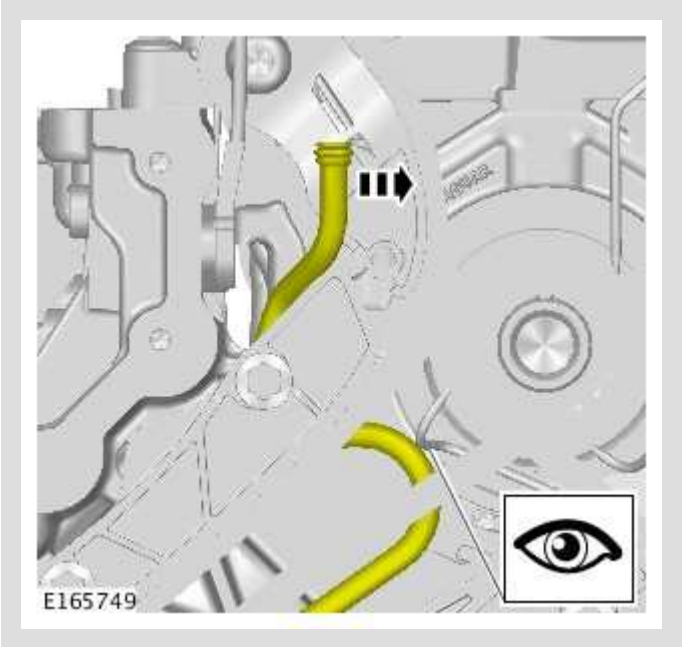
cardiagn.com

19.

CAUTION:

Take extra care not to damage the oil jet.

cardiagn.com

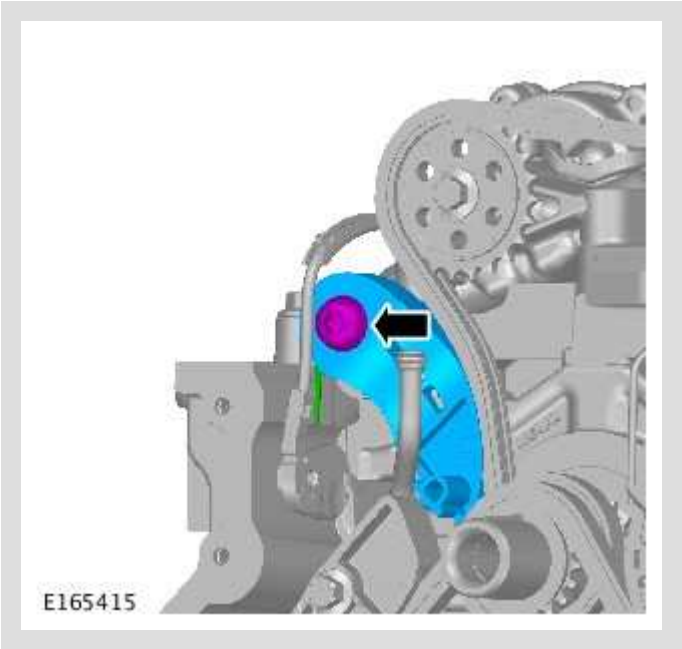


20.

CAUTION:

Take extra care not to damage the surrounding components.

cardiagn.com

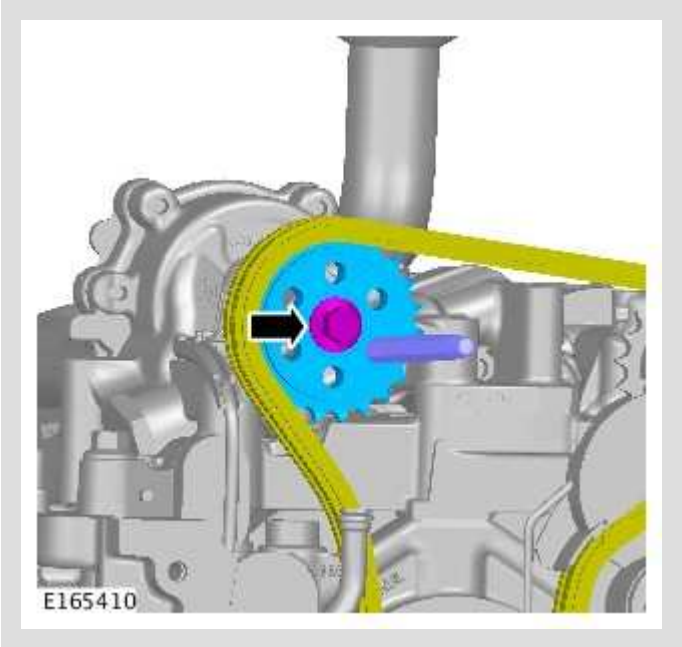


21.

CAUTION:

Using a suitable tool, lock the component.

cardiagn.com

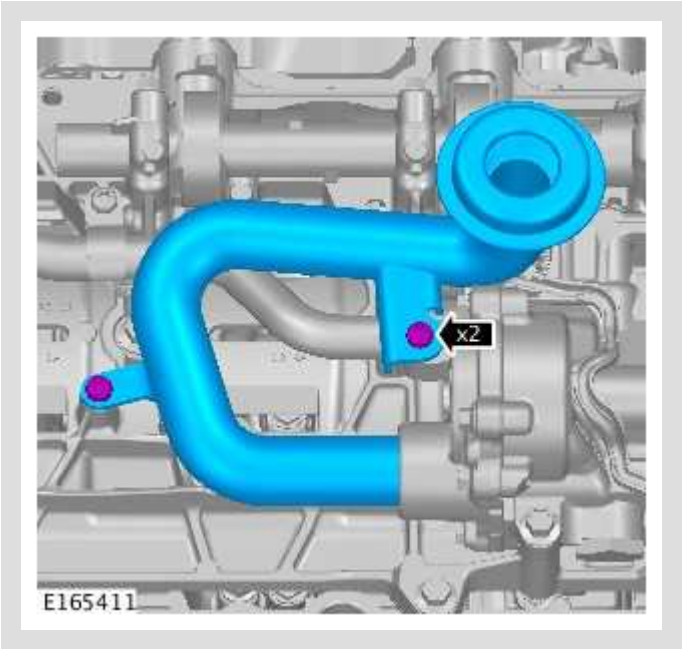


22.

NOTE:

2WD vehicles.

cardiagn.com

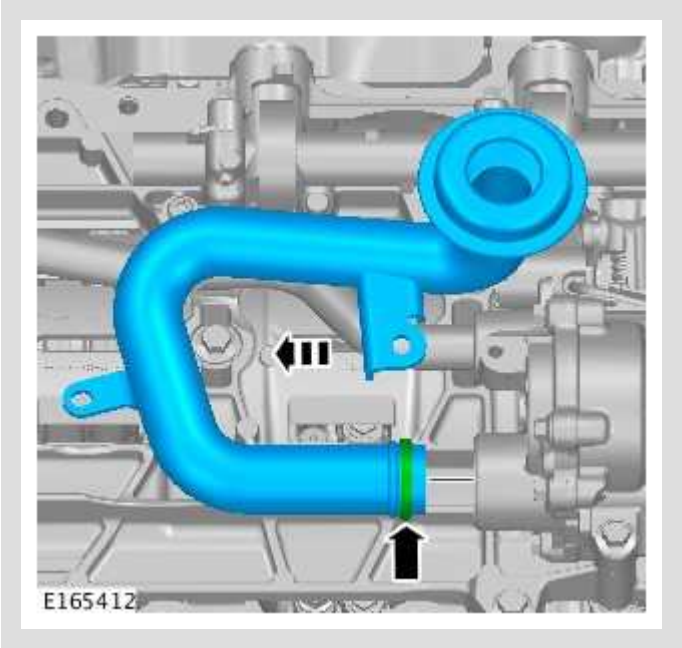


23.

NOTES:

- 2WD vehicles.
- Remove and discard the O-ring seal.

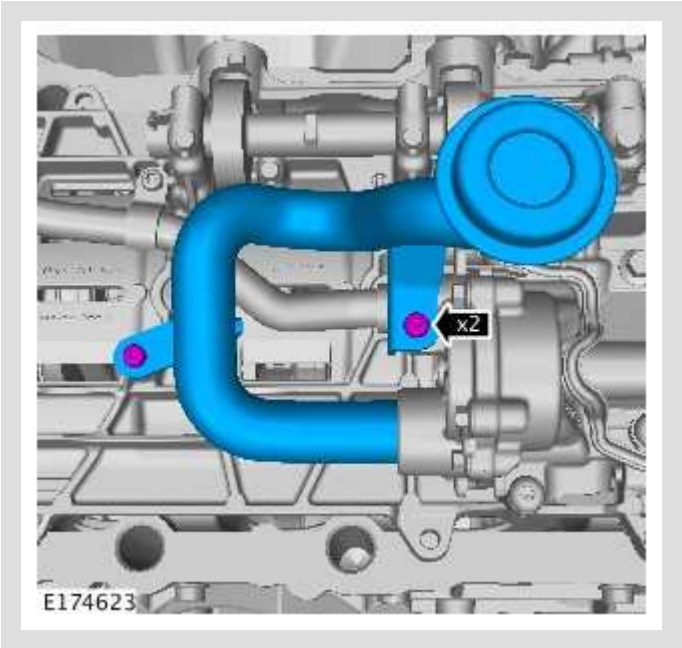
cardiagn.com



24.

NOTE:

4WD vehicles.

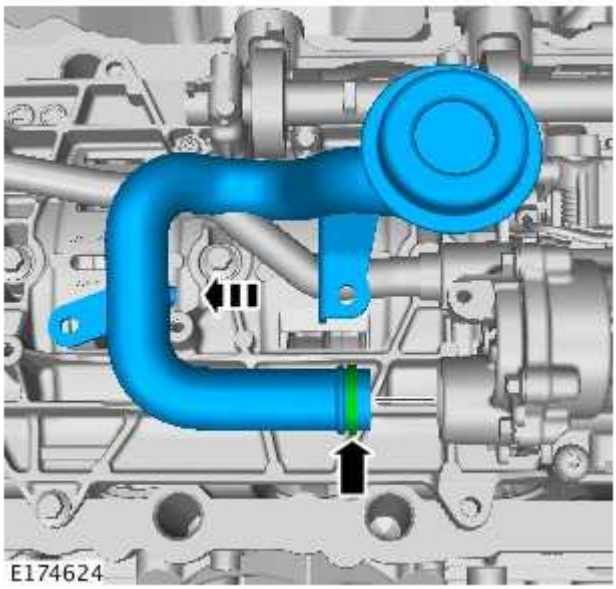


cardiagn.com

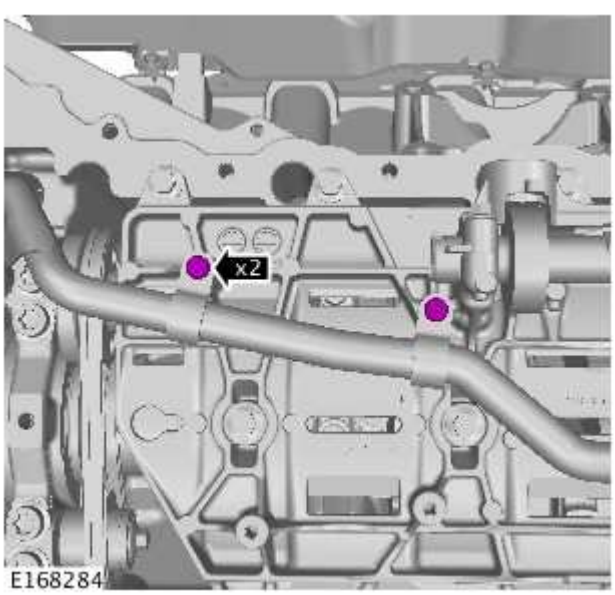
25.

NOTES:

- 4WD vehicles.
- Remove and discard the O-ring seal.

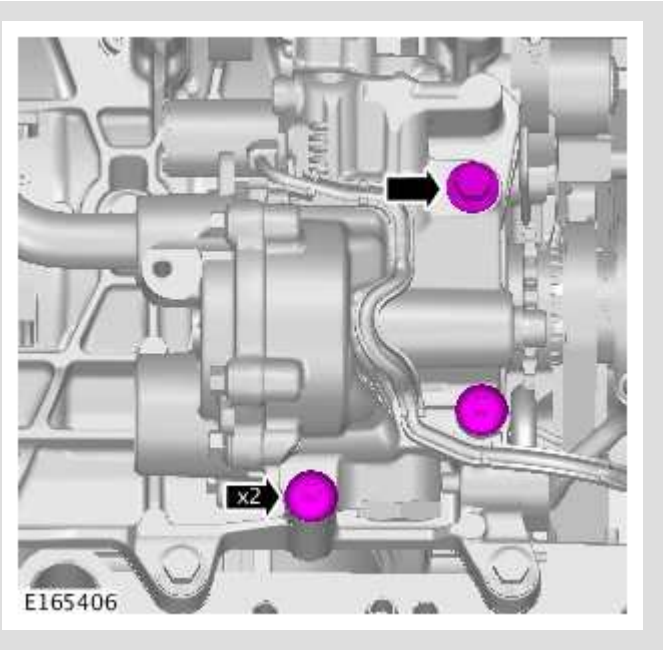


26.

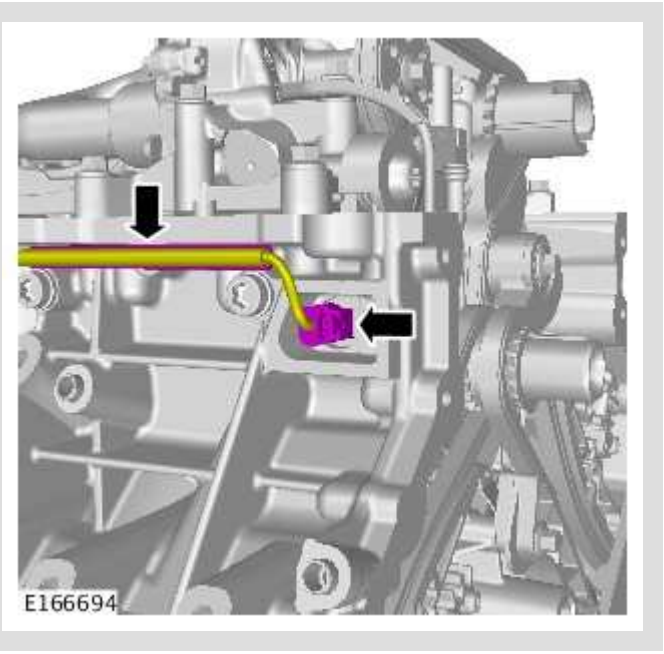


27.

cardiagn.com



28.

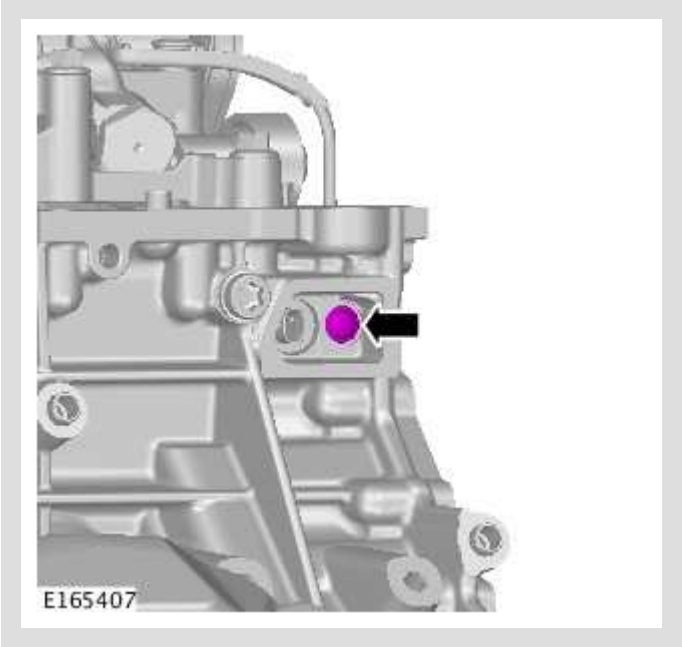


29.

CAUTION:

Discard the bolt.

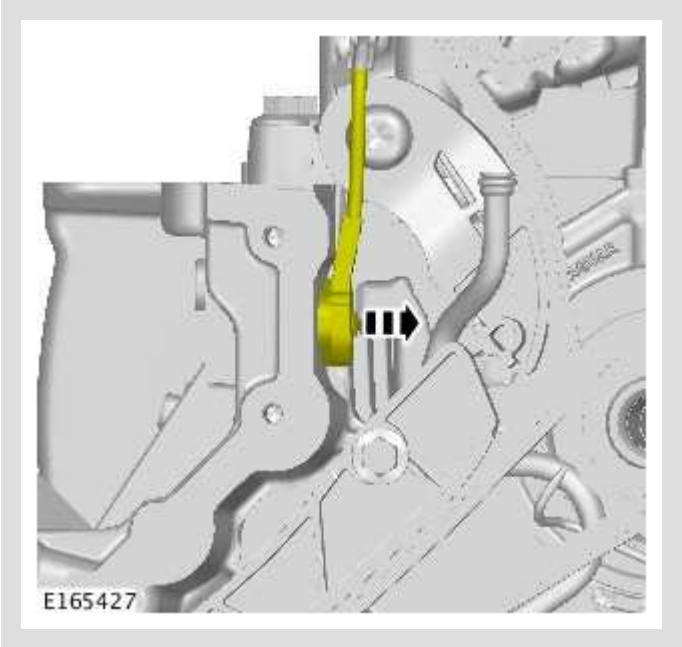
cardiagn.com



30.

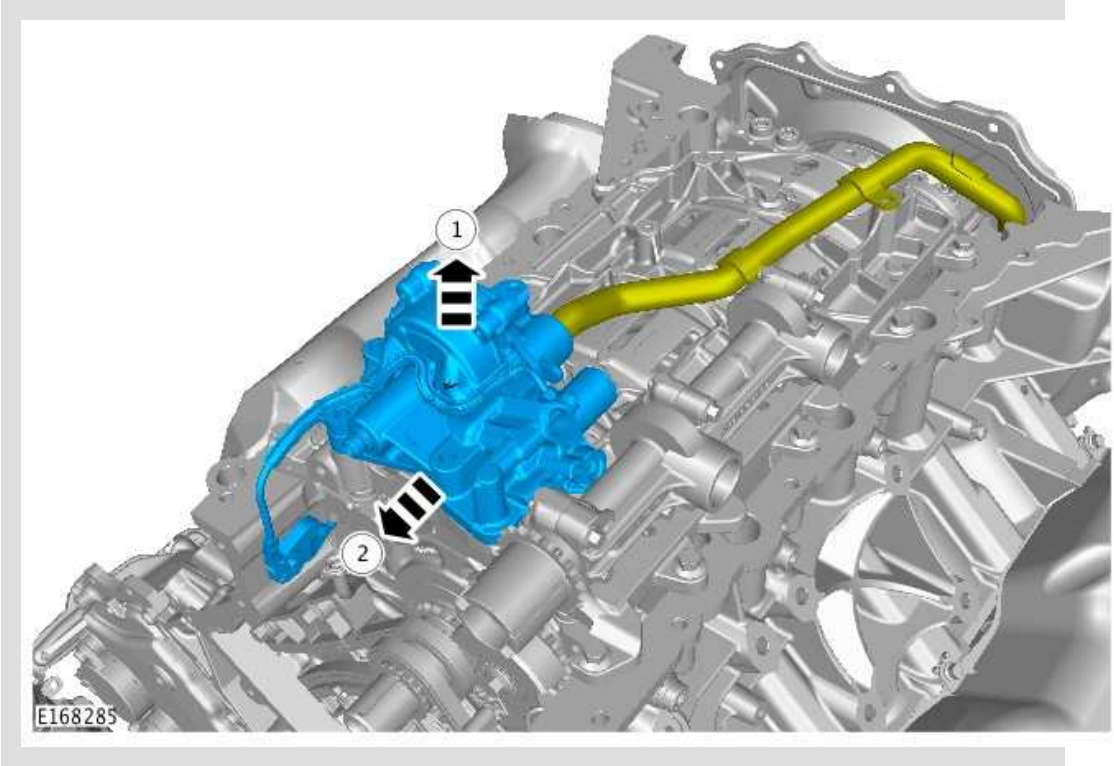
CAUTION:

Take extra care not to damage the component.



31.

cardiagn.com

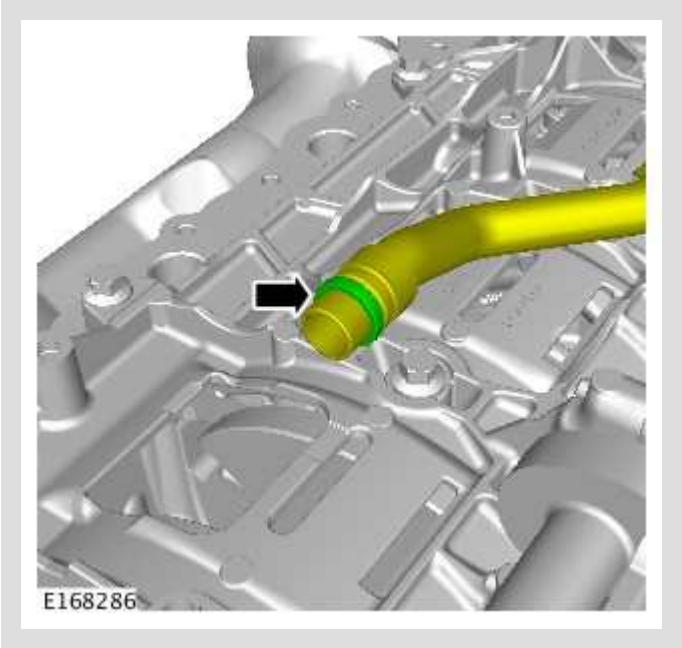


32.

CAUTION:

Remove and discard the O-ring seal.

cardiagn.com



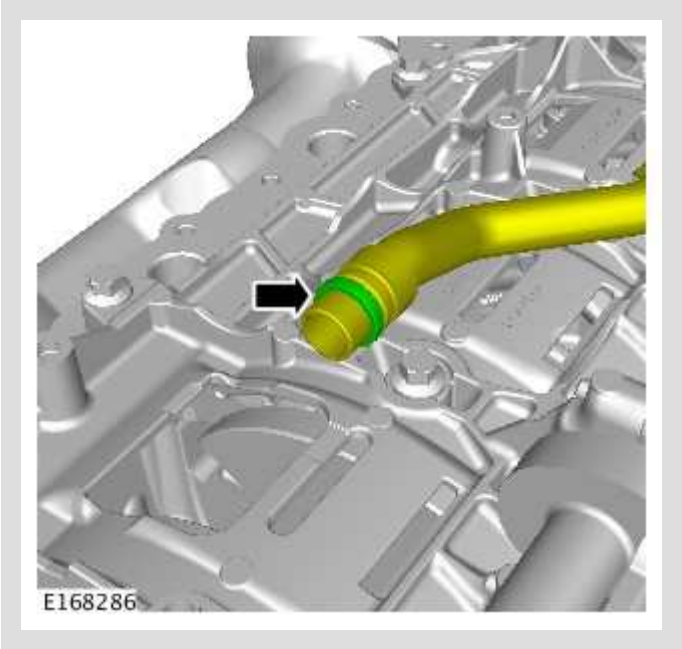
INSTALLATION

1.

CAUTION:

A new O-ring seal is to be installed.

cardiagn.com



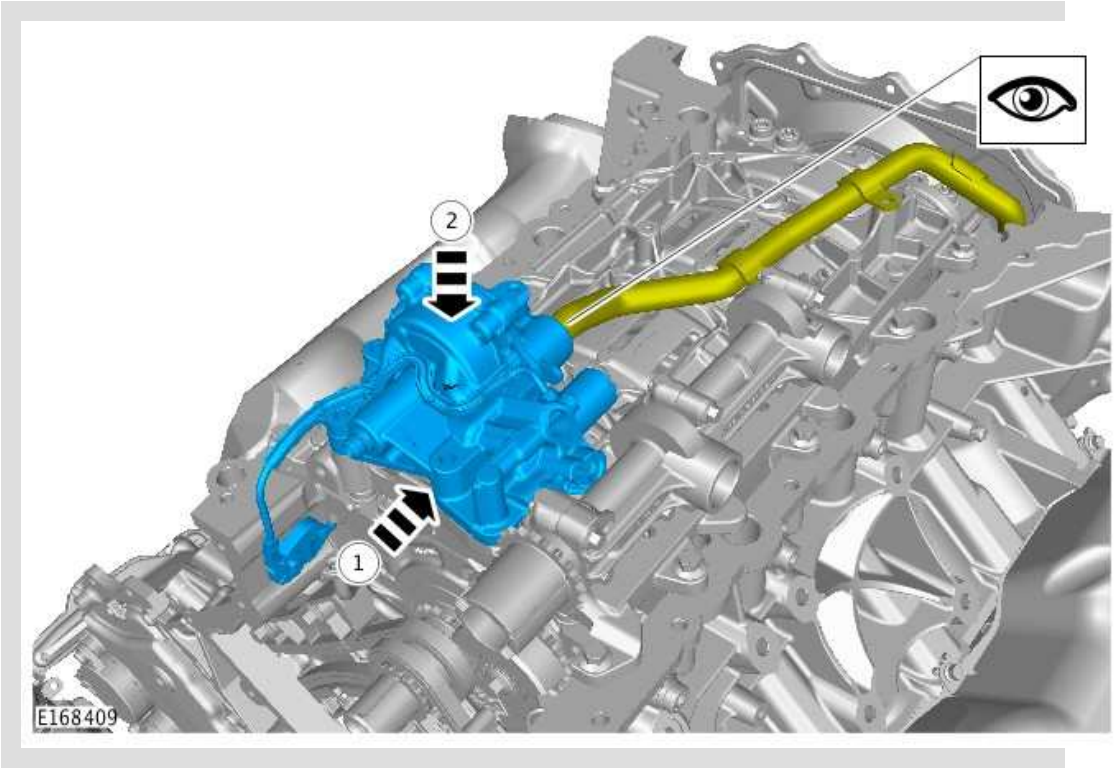
Lubricate the new O-ring seal.

2.

CAUTIONS:

- Install the component shown in the sequence shown.
- Take extra care not to damage the seal when installing the component.

cardiagn.com

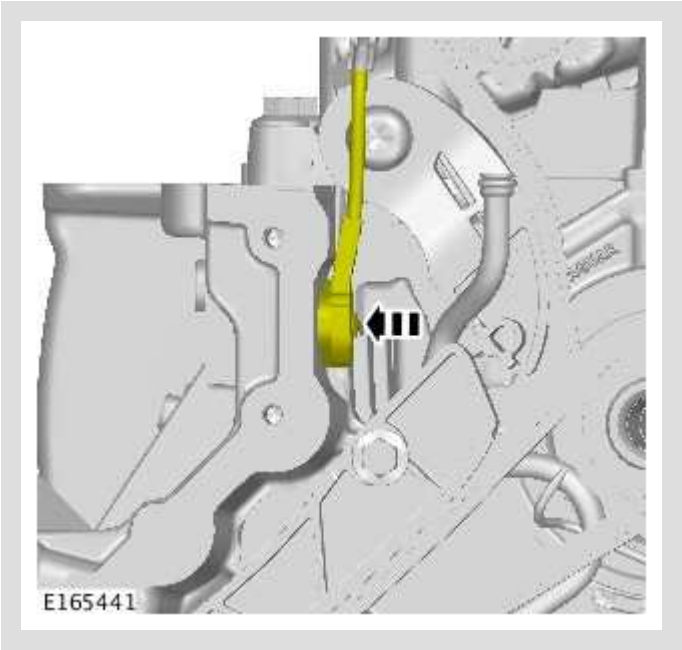


3.

CAUTION:

Take extra care when installing the component.

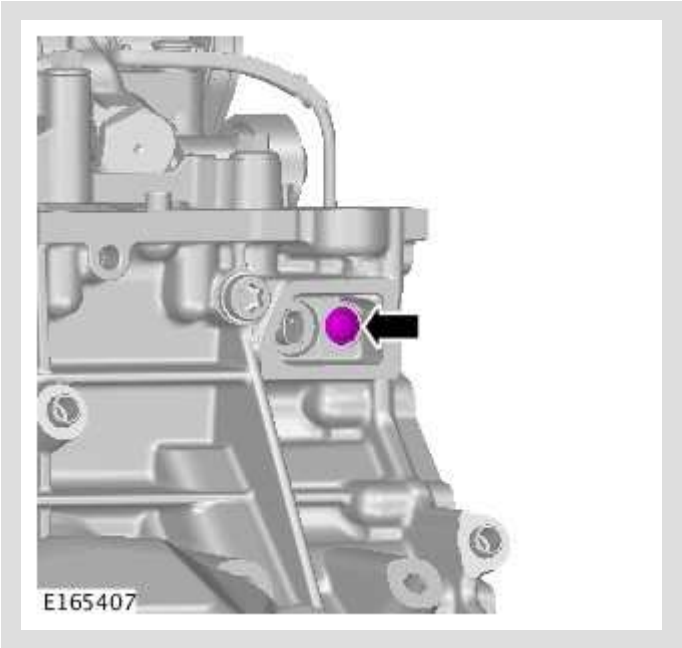
cardiagn.com



4.

CAUTION:

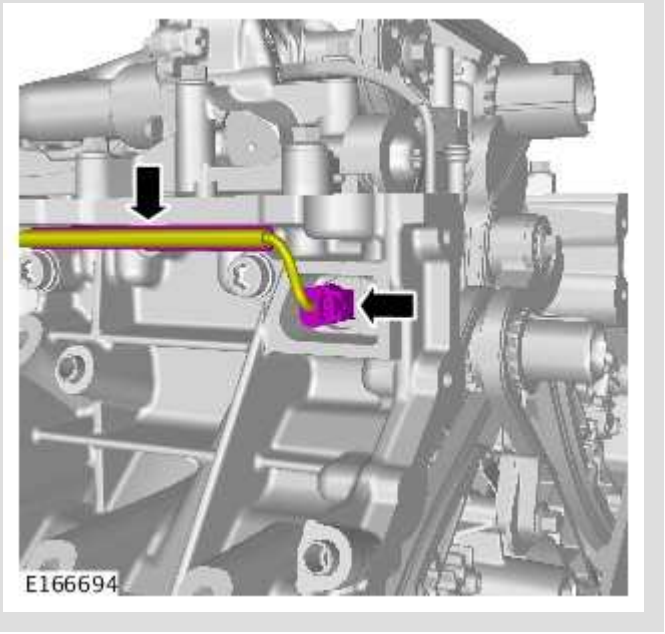
Make sure that a new bolt is installed.



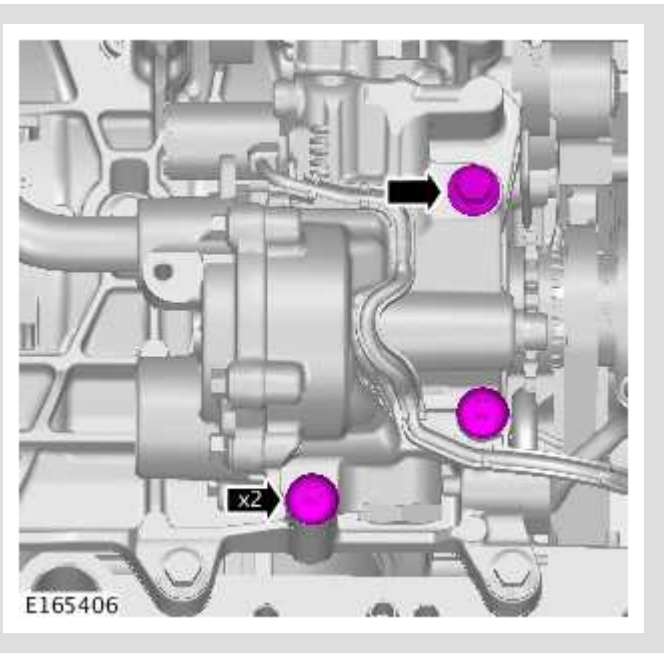
cardiagn.com

Torque: **12 Nm**

5.



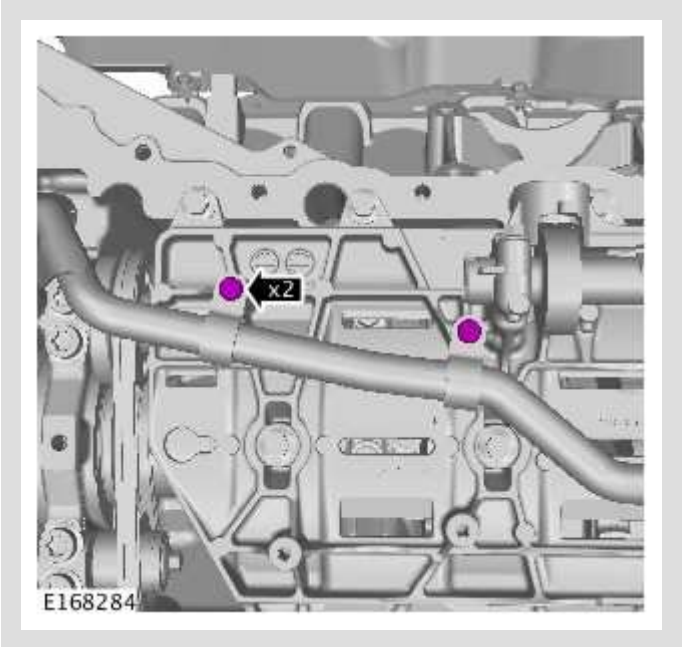
6.



Torque: **25 Nm**

7.

cardiagn.com



Torque: **12 Nm**

8.

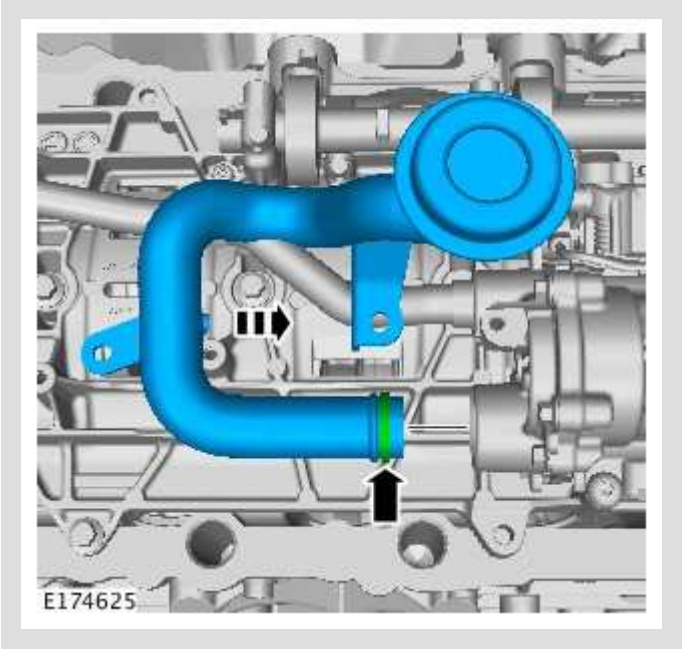
CAUTION:

A new O-ring seal is to be installed.

NOTE:

4WD vehicles.

cardiagn.com

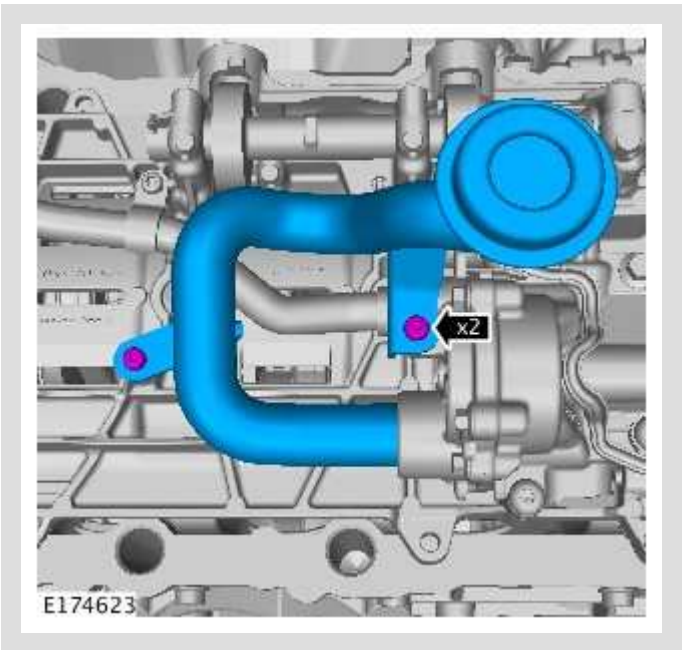


Lubricate the new O-ring seal.

9.

NOTE:

4WD vehicles.



cardiagn.com

Torque: **12 Nm**

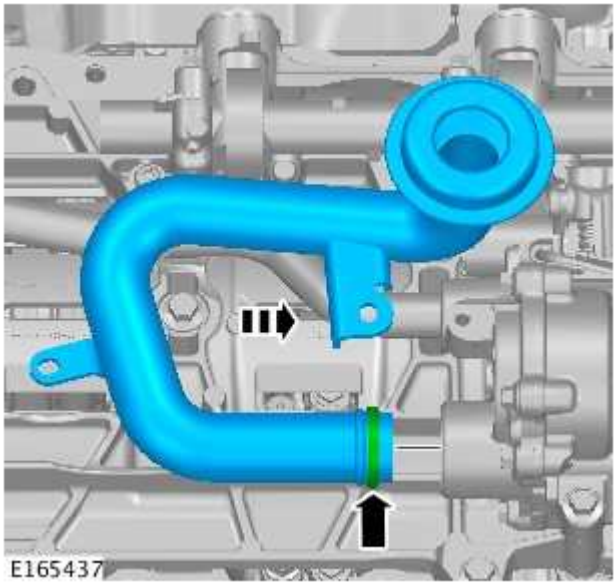
10.

CAUTION:

A new O-ring seal is to be installed.

NOTE:

2WD vehicles.



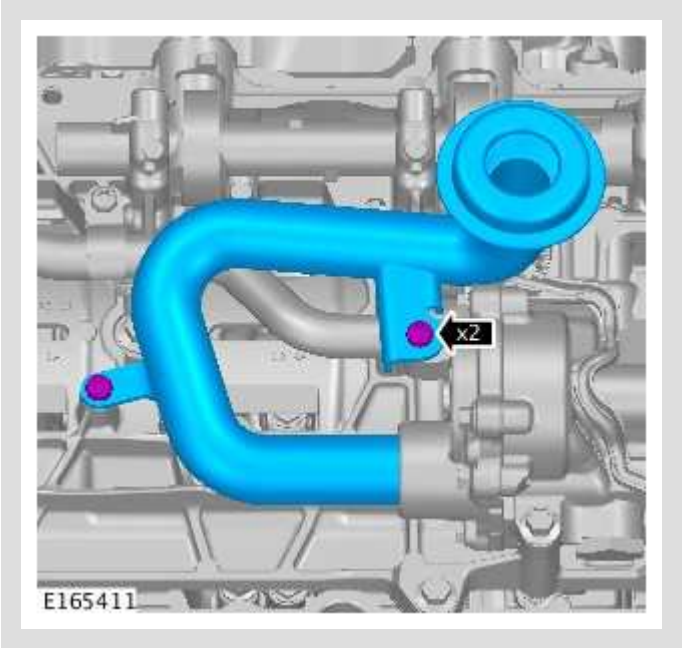
Lubricate the new O-ring seal.

11.

NOTE:

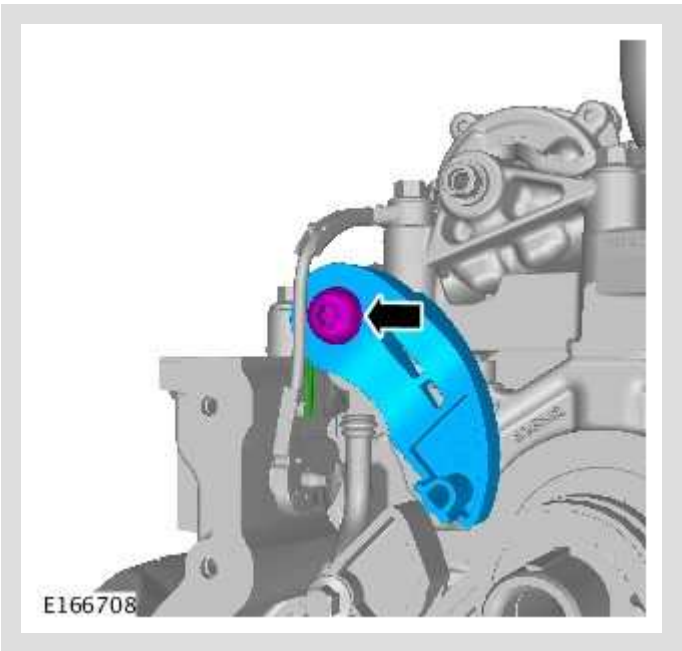
2WD vehicles.

cardiagn.com



Torque: **12 Nm**

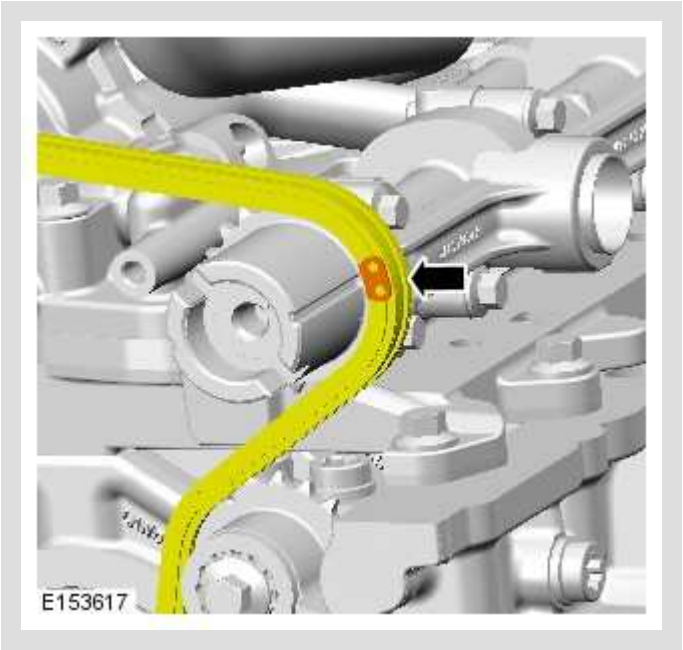
12.



Torque: **21 Nm**

13.

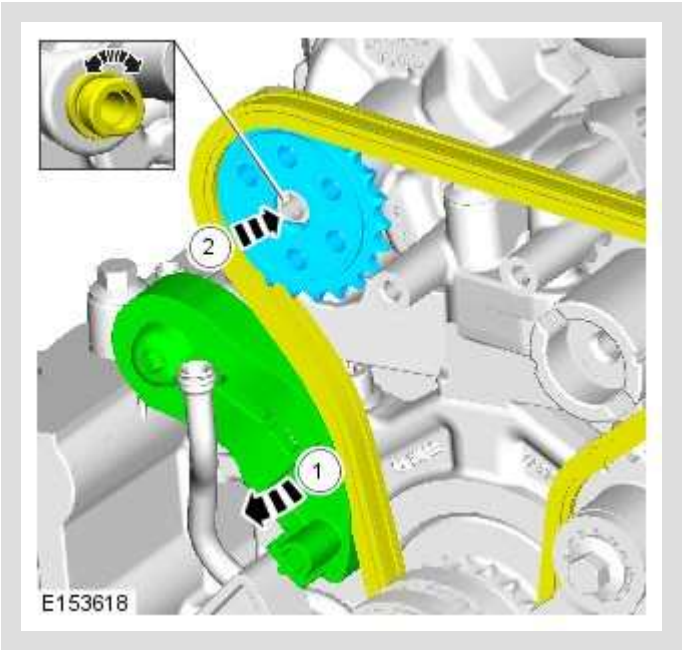
cardiagn.com



14.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.



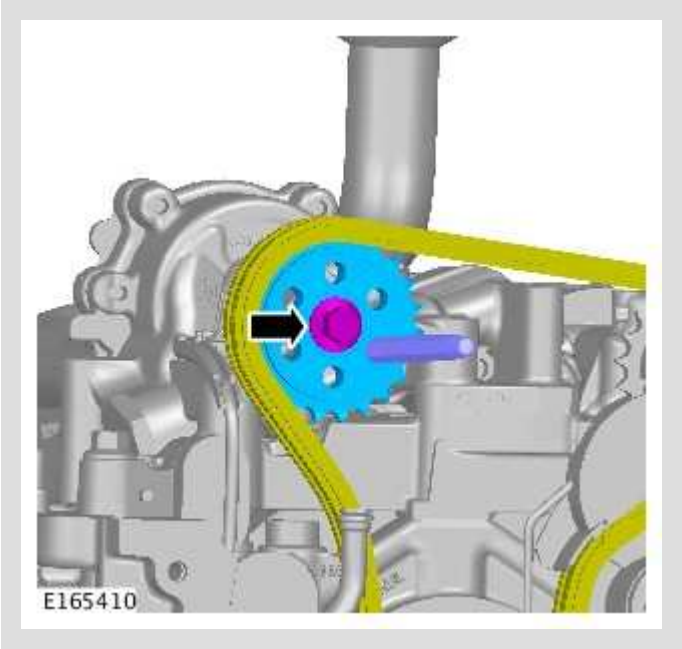
Using a suitable tool, compress the timing chain tensioner.

cardiagn.com

15.

CAUTION:

Using a suitable tool, lock the component.



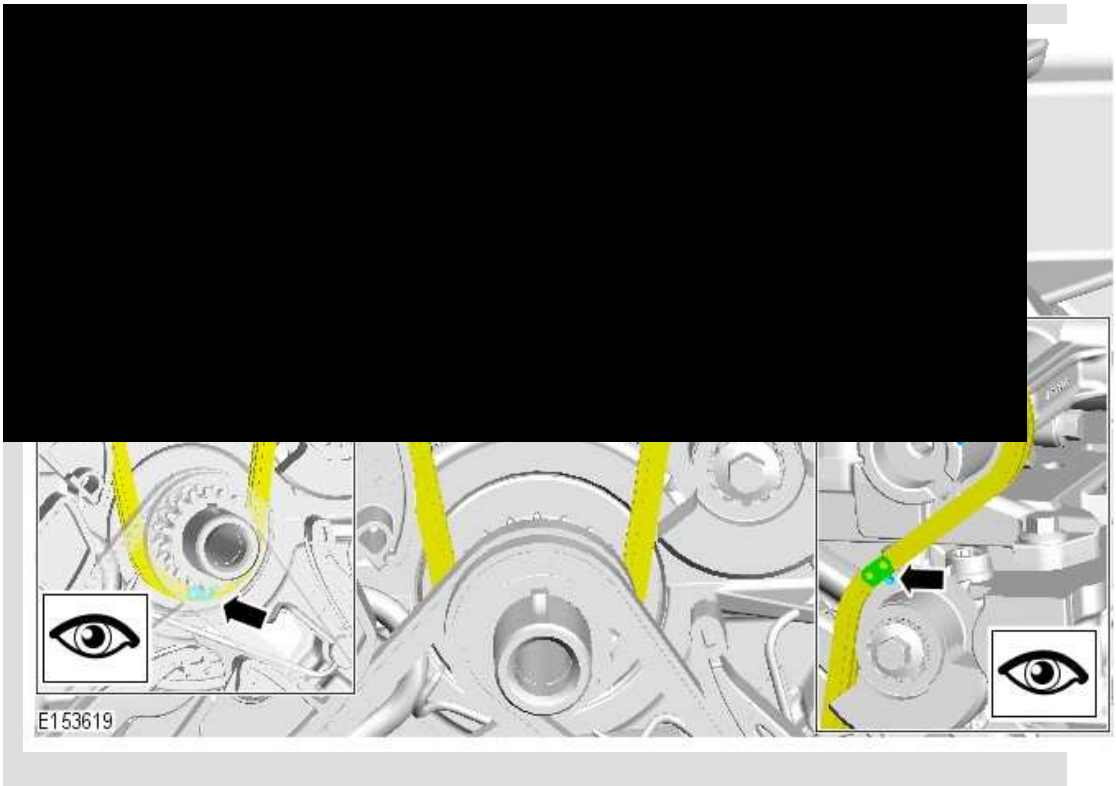
Torque: **21 Nm**

16.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

cardiagn.com



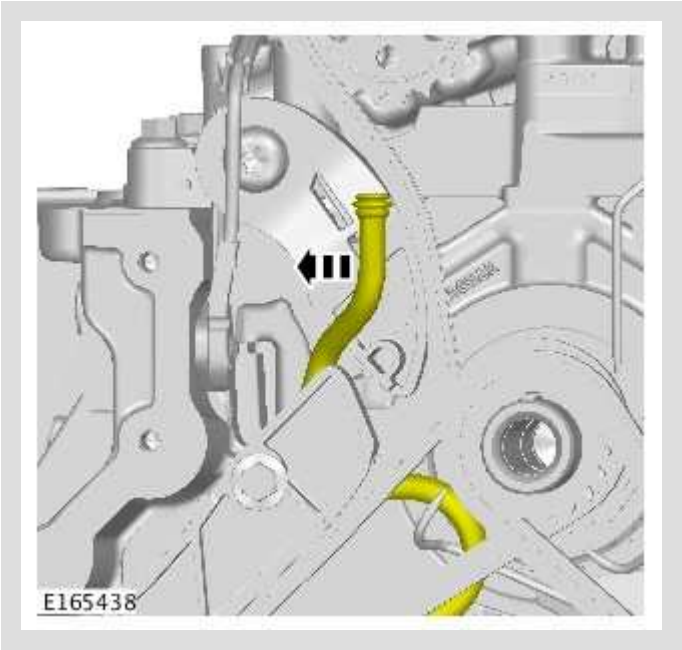
Install the lower timing chain making sure the coloured chain links align correctly with the fuel rail high-pressure fuel pumps camshaft, balance weight and crankshaft sprocket markings.

17.

CAUTION:

Take extra care not to damage the oil jet.

cardiagn.com



18.

CAUTION:

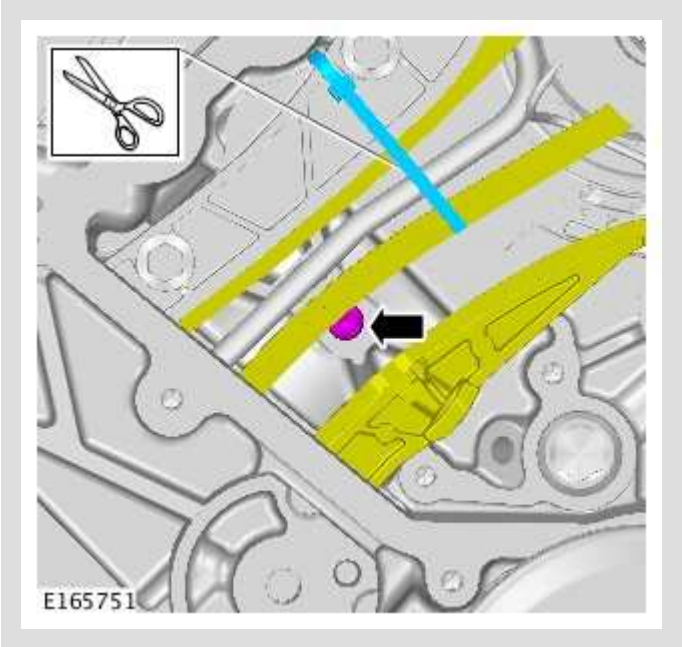
Take extra care not to damage the oil jet.

19.

cardiagn.com

CAUTION:

Use only a long torx socket or torx driver. Do not use a small torx socket, as it may damage the timing chain.



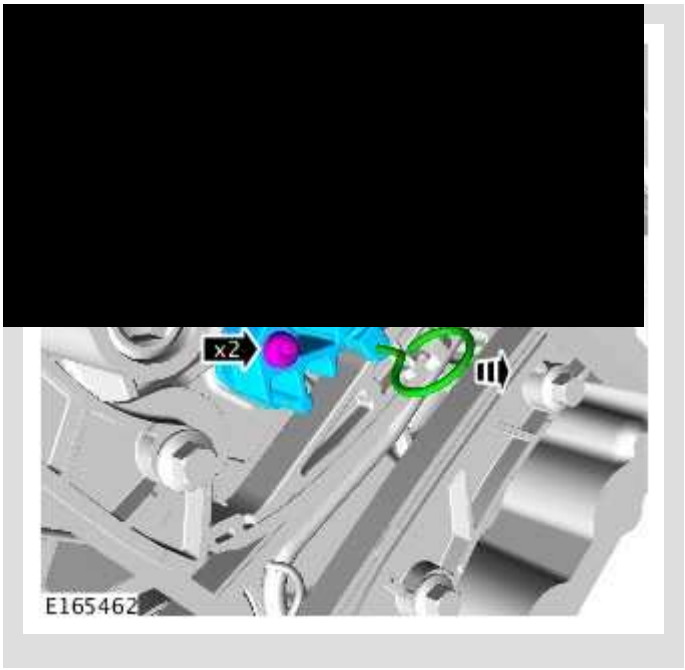
Hold the bolt with a magnet to prevent it from dropping.

Torque: **10 Nm**

20.

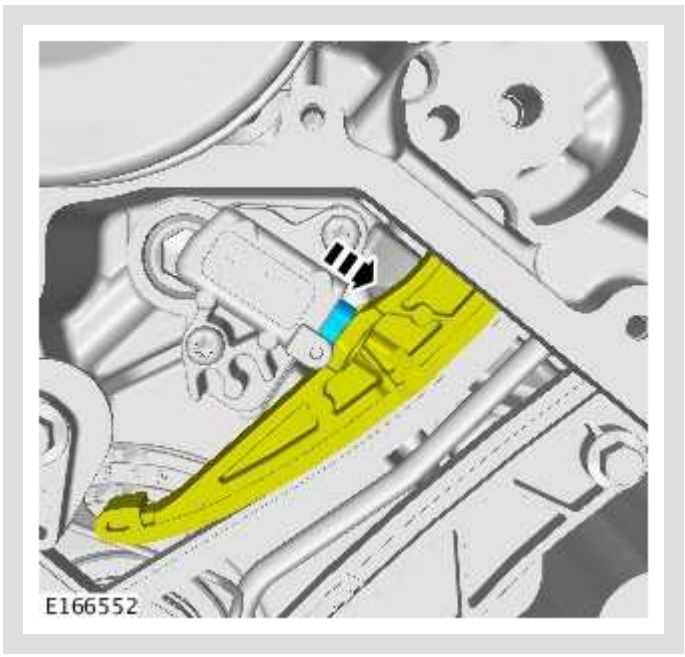
21.

cardiagn.com



Torque: **12 Nm**

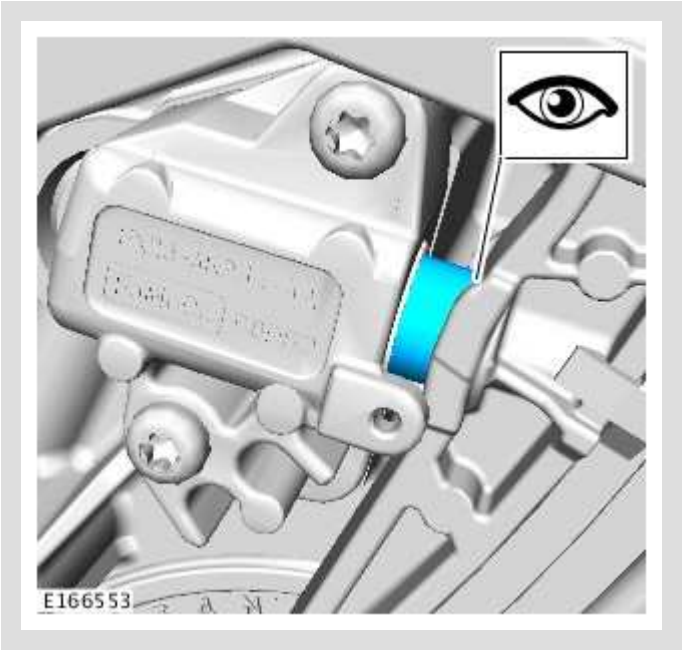
22.



Rotate the crankshaft a full turn clockwise to settle the components.

23.

cardiagn.com



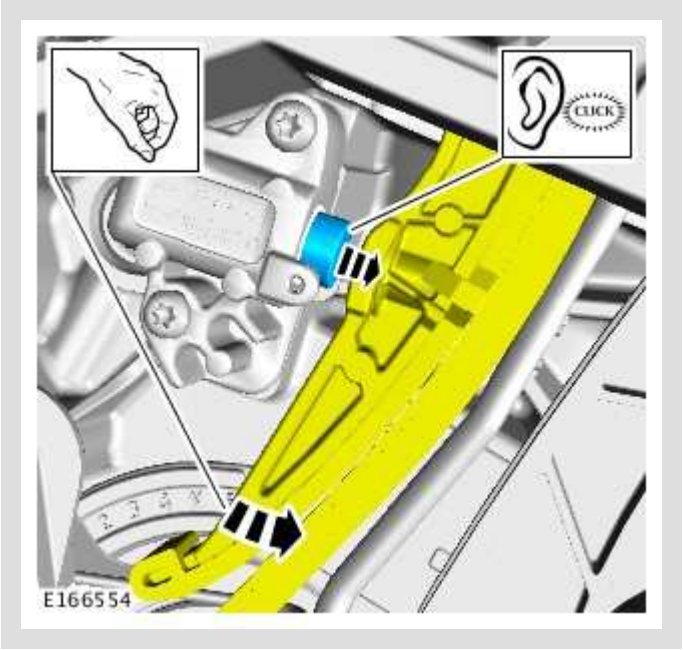
The piston should apply tension to the timing chain guide.

24.

CAUTION:

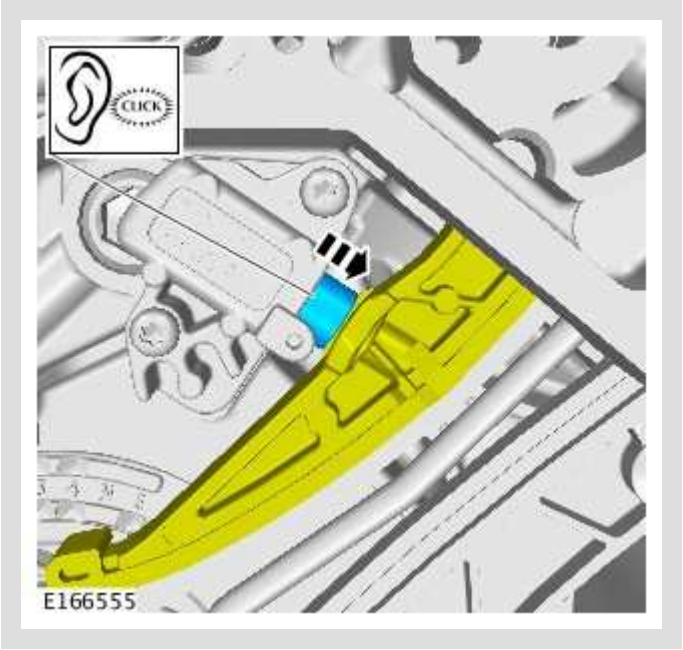
Make sure the tension is maintained.

cardiagn.com



Using considerable force, move the timing chain guide away from the tensioner to allow the first stage ratchet mechanism to be applied.

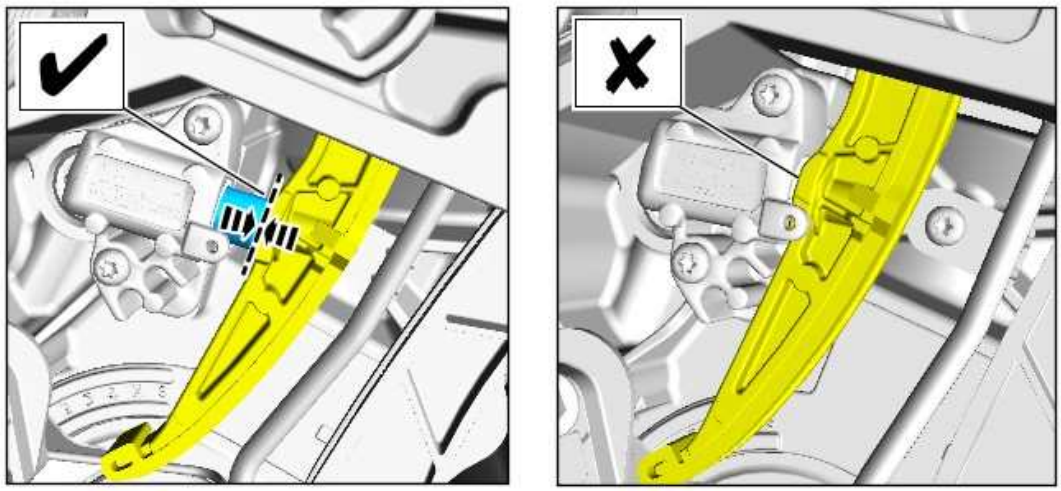
25.



The piston should eject slightly, and an audible click should be heard.

26.

cardiagn.com



E166556

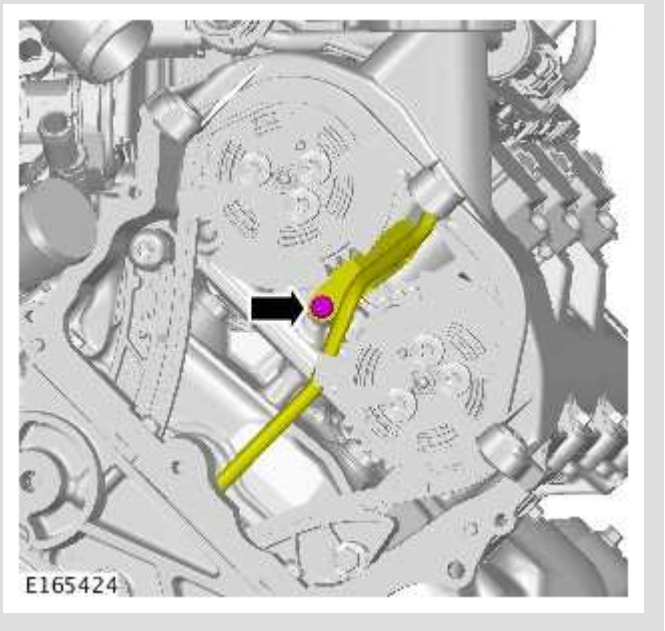
If the piston can be pushed back, repeat steps 19-22 to reset the tensioner.

cardiagn.com

27.

If the piston will not retract, and tension is on the chain. The tensioner is correct.

28.



Hold the bolt with a magnet to prevent it from dropping.
Torque: **10 Nm**

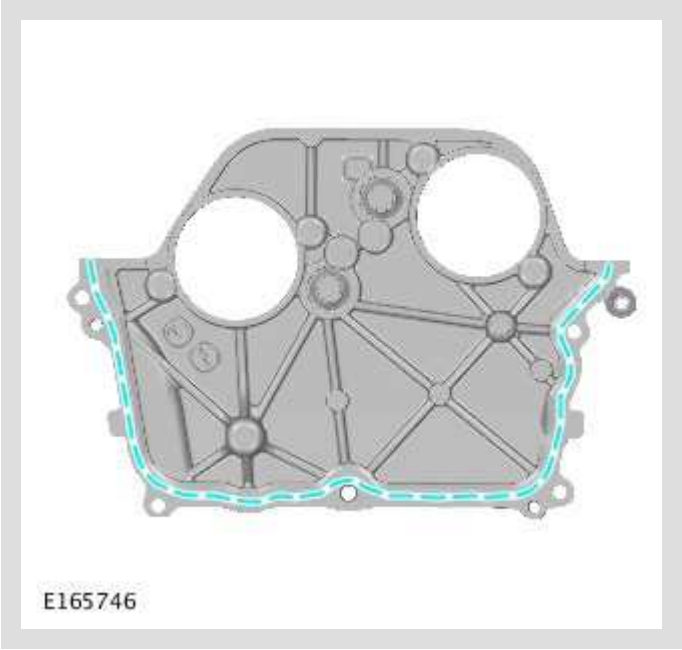
29.

NOTE:

Make sure that all traces of the old sealant are removed from the mating faces.

cardiagn.com

30.



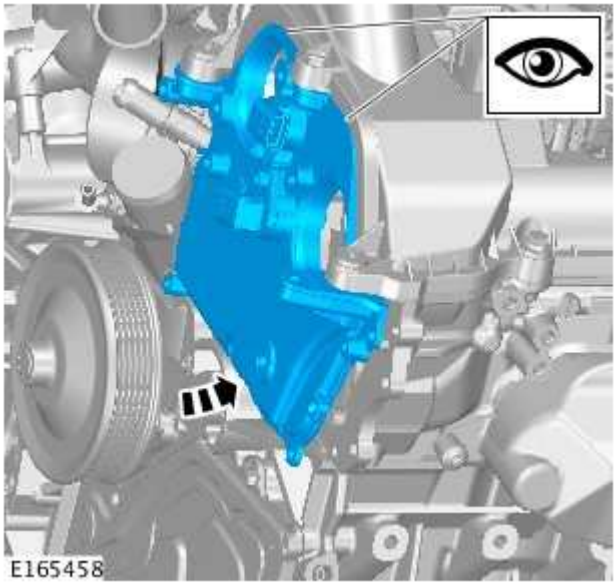
Apply RTV sealant (Loctite 5901G) to the areas shown, and tighten the bolts within 7 minutes.

31.

CAUTION:

Take extra care not to damage the seal when installing the component.

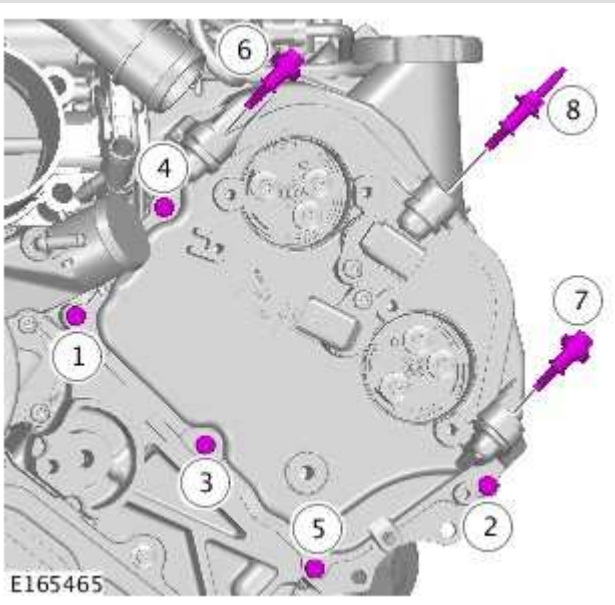
cardiagn.com



32.

NOTE:

Tighten the retaining bolts in the indicated sequence.

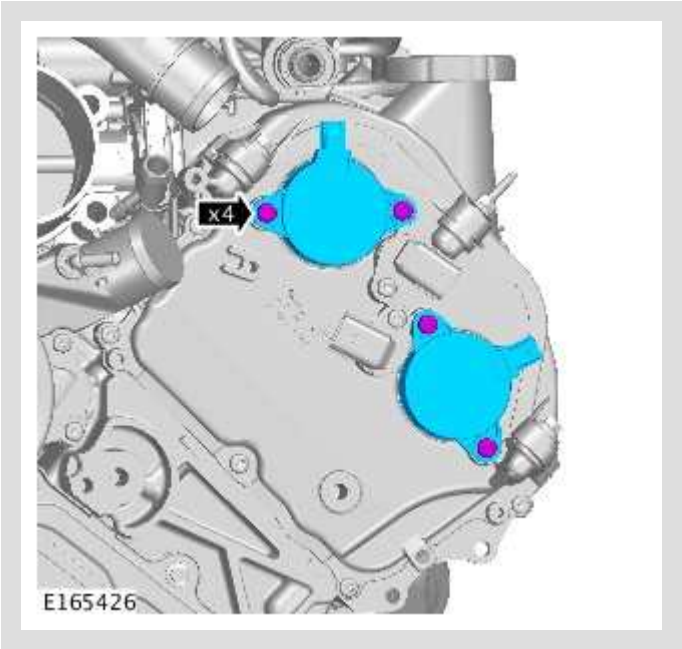


13

Torque: **12 Nm**

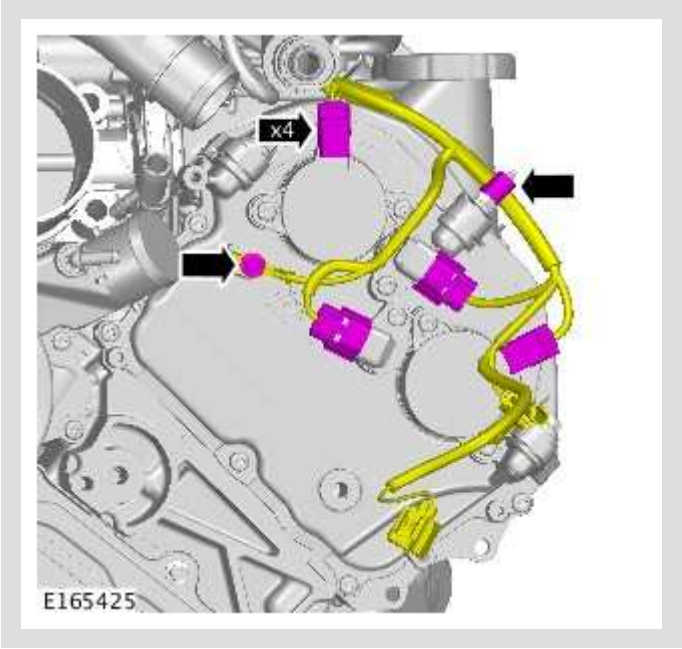
33.

cardiagn.com



Torque: **10 Nm**

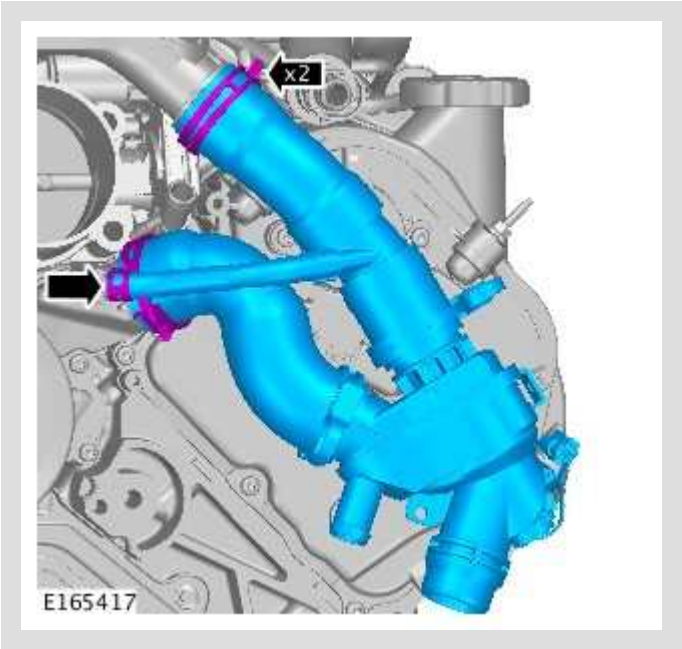
34.



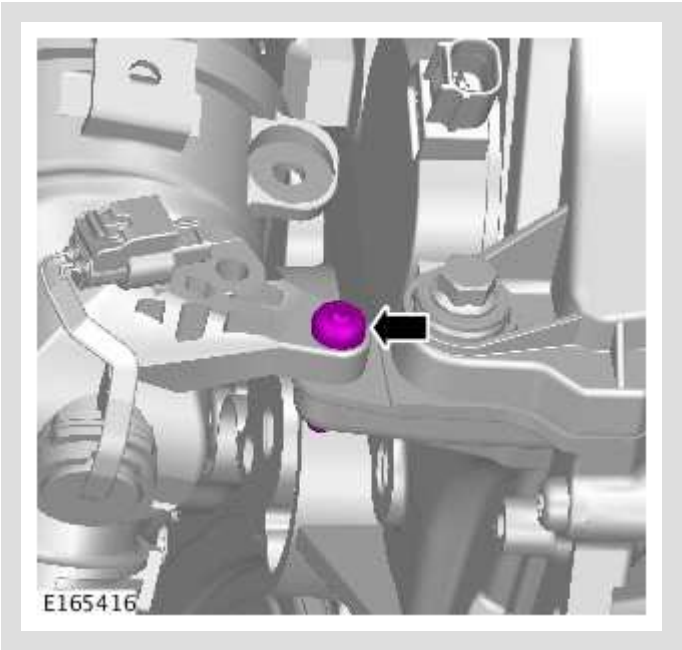
Torque: **10 Nm**

35.

cardiagn.com



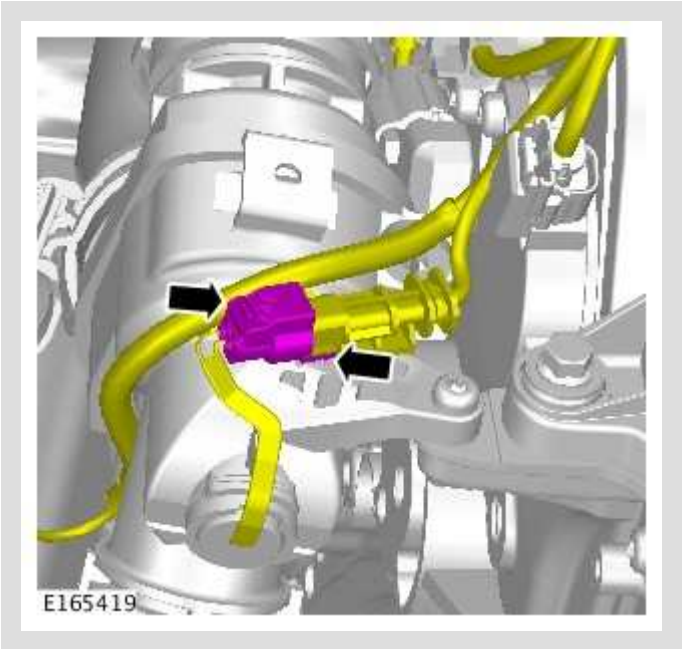
36.



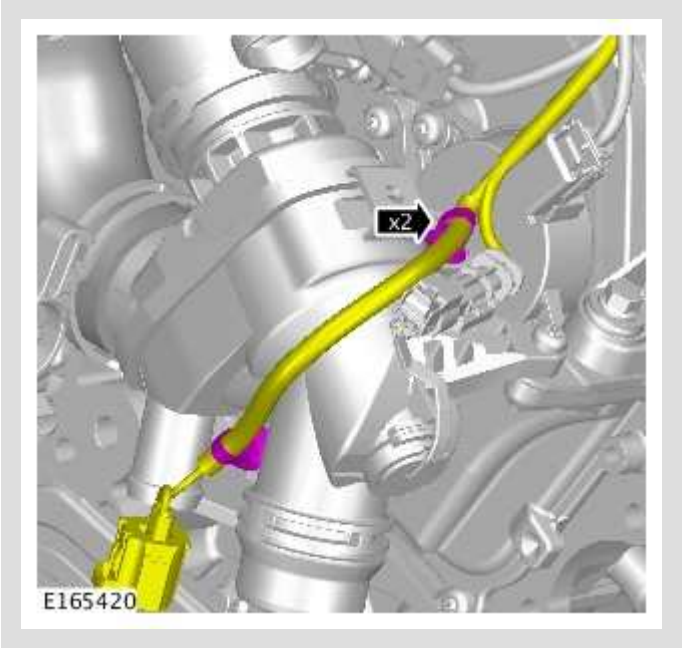
Torque: **10 Nm**

37.

cardiagn.com



38.



39. Refer to: Oil Pan Extension (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Oil Pan (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

40. Connect the battery ground cable.

cardiagn.com

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

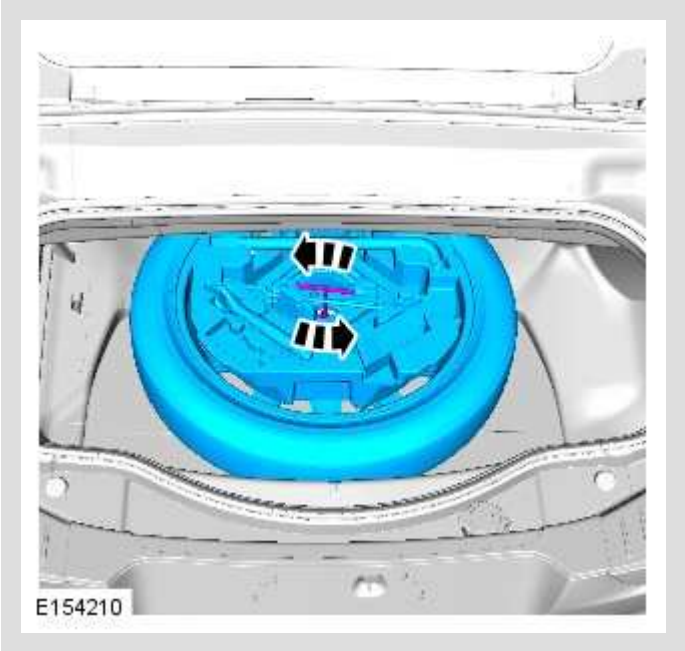
1.

cardiagn.com

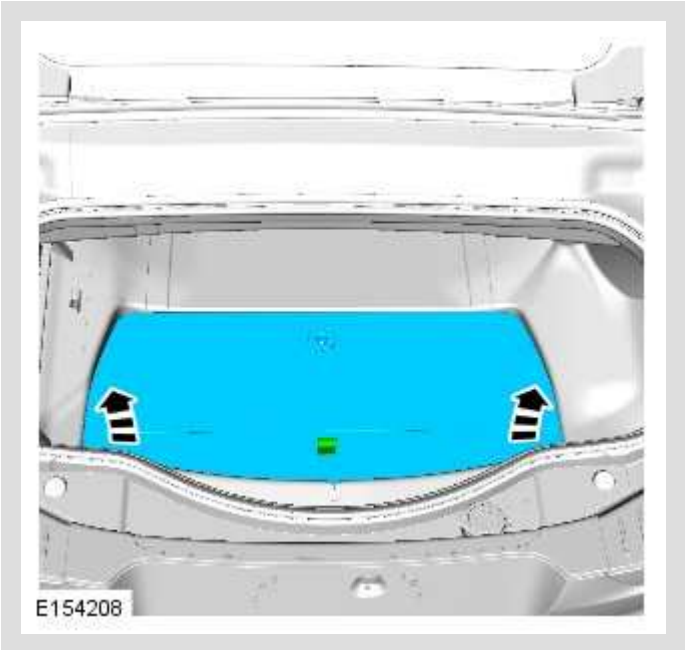
Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

2. Obtain and record the audio unit preset radio frequencies.

3.

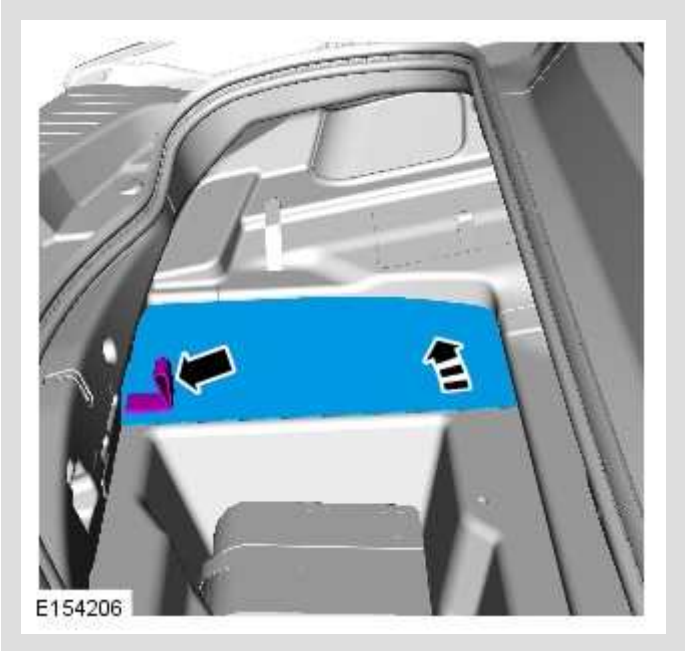


4.



5.

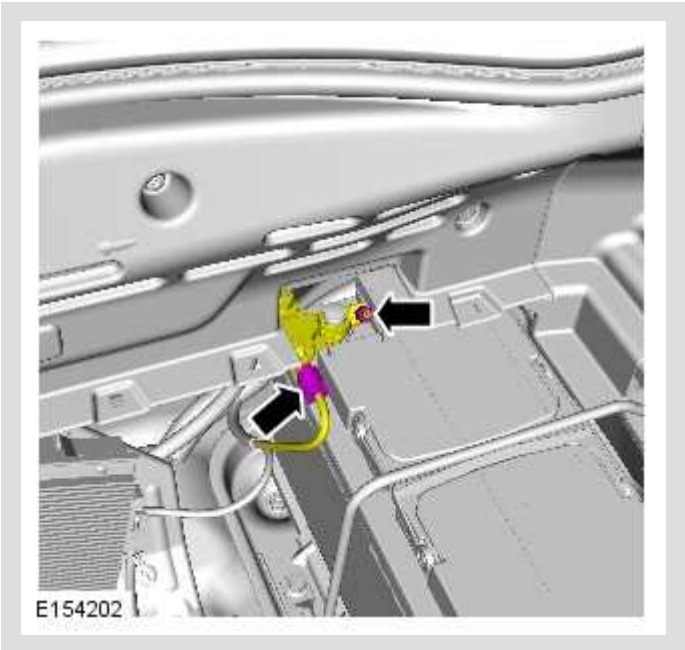
cardiagn.com



6.

CAUTION:

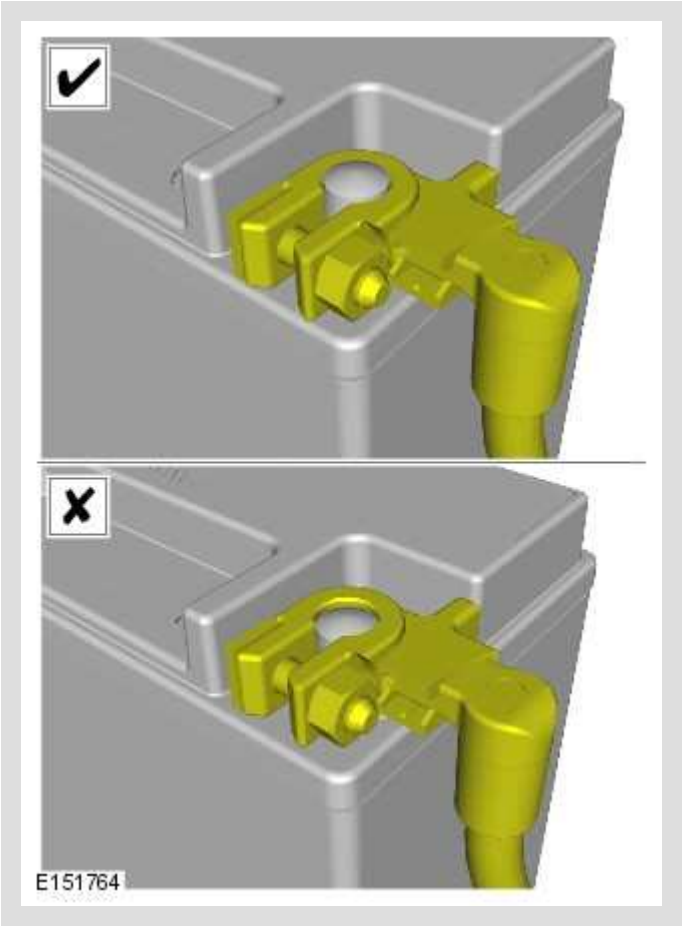
Take extra care not to damage the wiring harnesses.



cardiagn.com

Torque: **6 Nm**

7.



8. To install, reverse the removal procedure.

9.

NOTE:

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

ENGINE (G1587022)

REMOVAL

REMOVAL

SPECIAL TOOL(S)

303-021

Engine support bracket

303-1435

Engine Lifting Brackets Rear

cardiagn.com

	303-1436 Engine Lifting Bracket Front

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some components shown removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
2. Refer to: Cooling Fan Motor and Shroud (303-03C Engine Cooling - V8 S/C 5.0L Petrol, Removal and Installation).
3. Refer to: Air Cleaner Outlet Intermediate Pipe LH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).
4. Refer to: Air Cleaner Outlet Pipe RH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).
5.

cardiagn.com

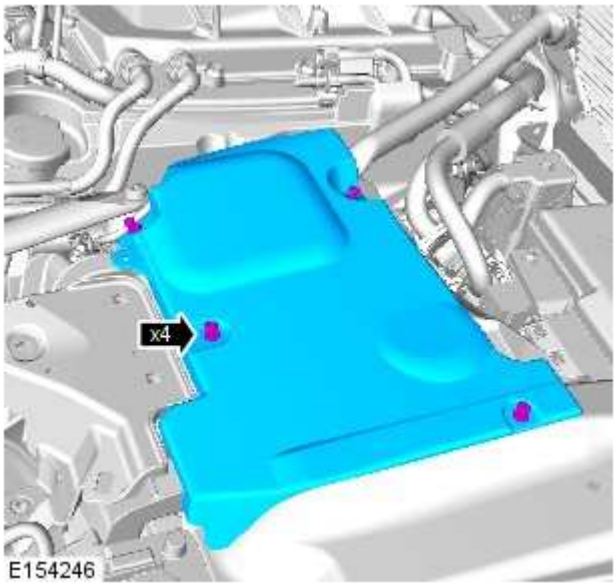
Refer to: Air Cleaner Outlet Pipe T-Connector (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

6. Refer to: Cooling System Draining, Filling and Bleeding (303-03C Engine Cooling - V8 S/C 5.0L Petrol, General Procedures).

7. Refer to: Transmission (307-01B Automatic Transmission /Transaxle - V8 S/C 5.0L Petrol, Installation).

8. **NOTE:**

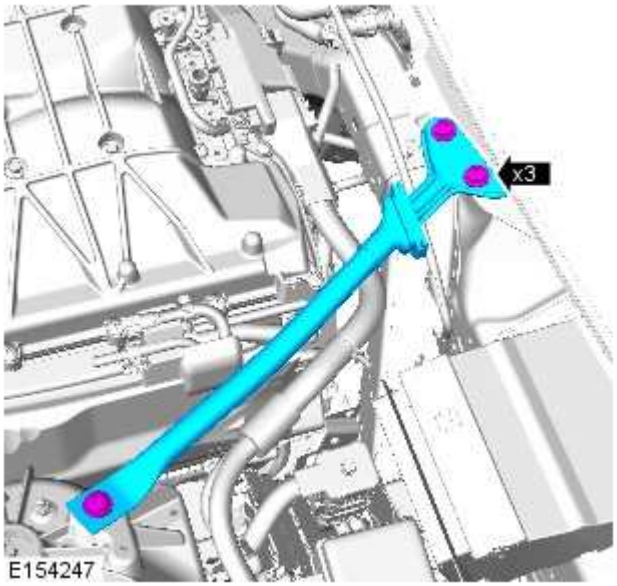
The step must be carried out on both sides.



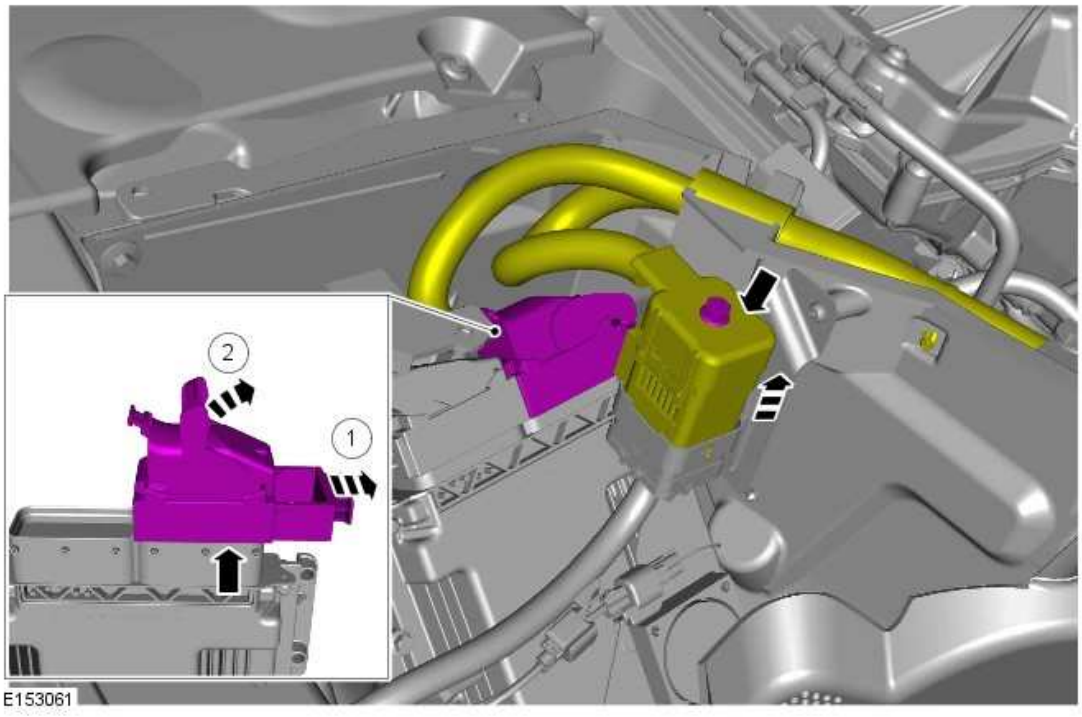
9. **NOTE:**

The step must be carried out on both sides.

cardiagn.com

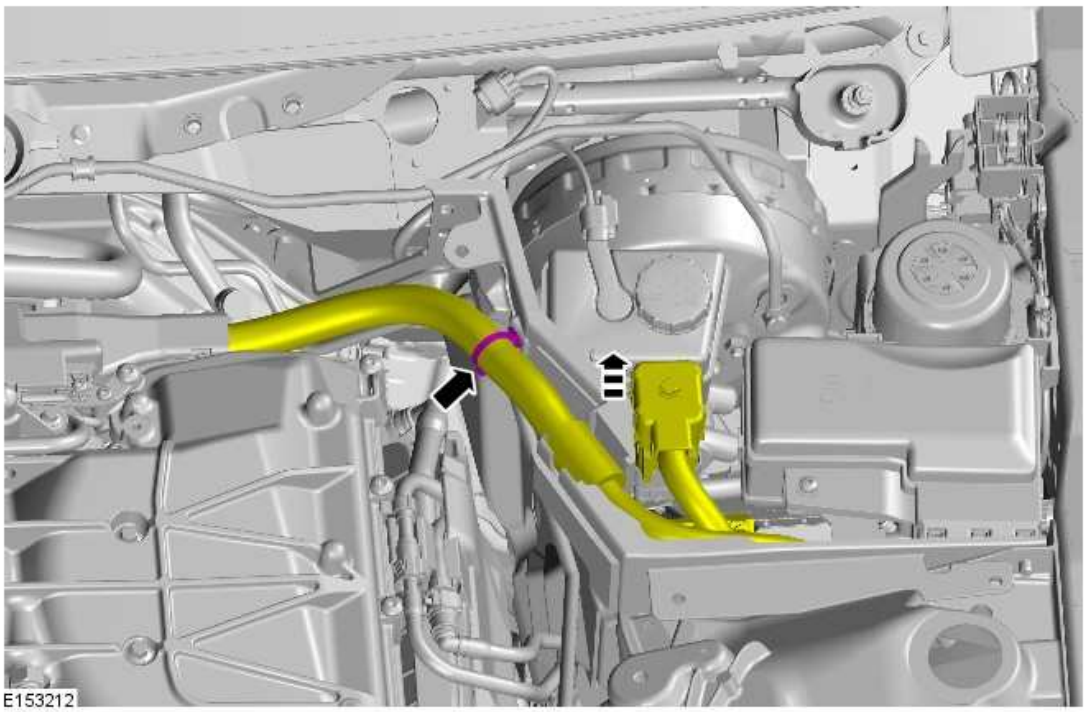


10.

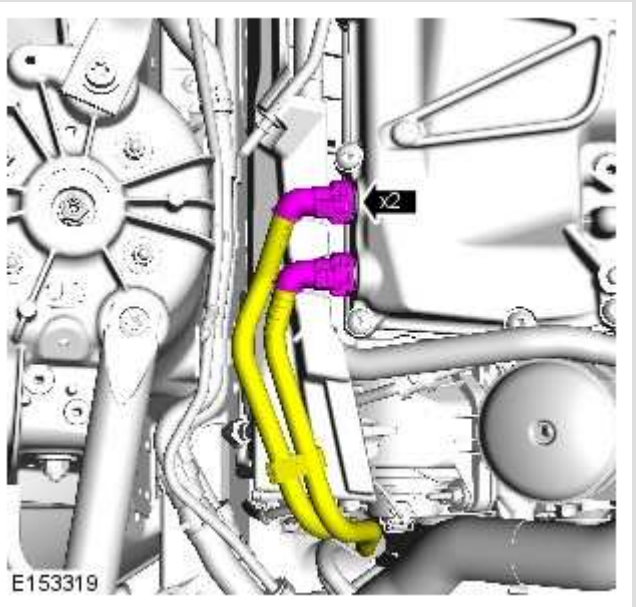


11.

cardiagn.com

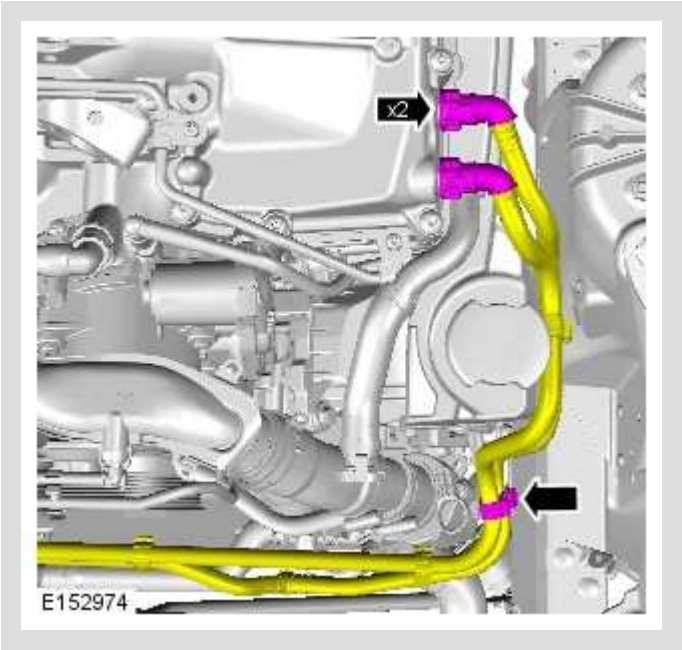


12.

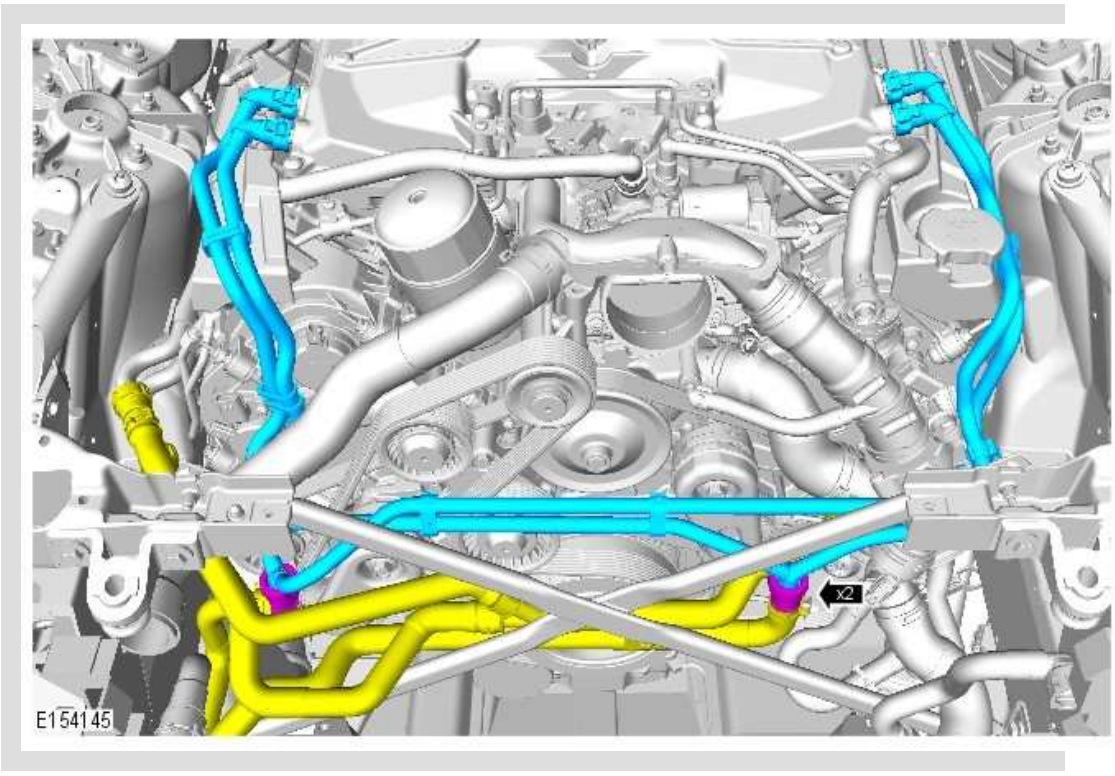


13.

cardiagn.com

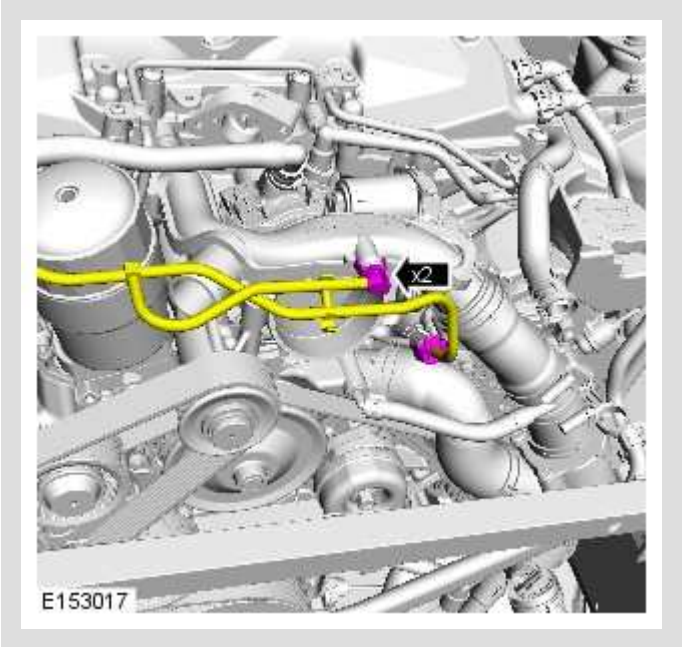


14.

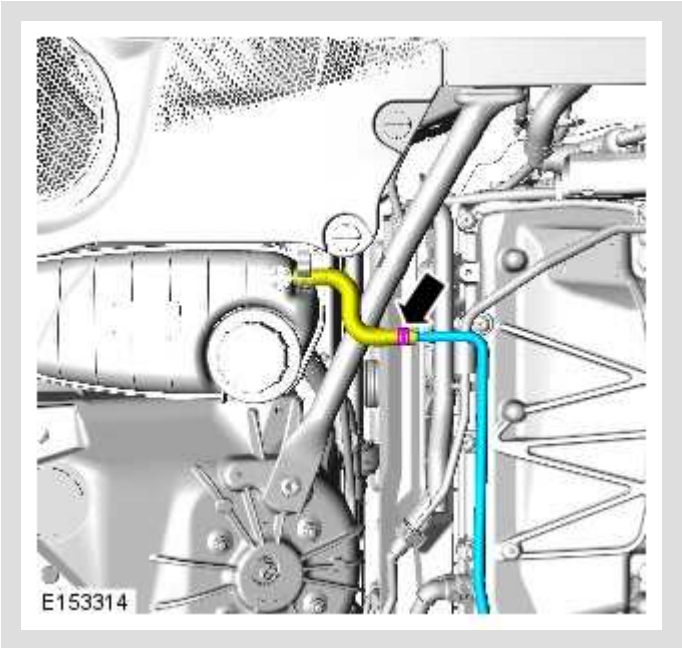


15.

cardiagn.com

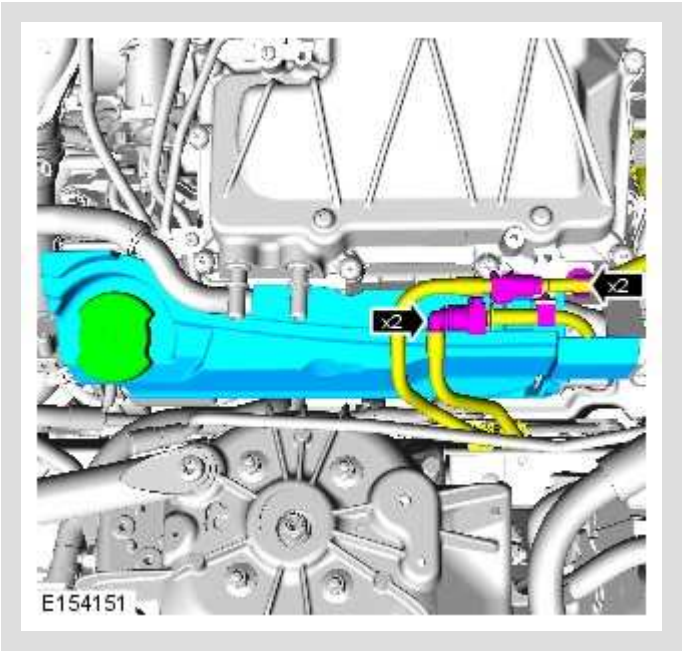


16.

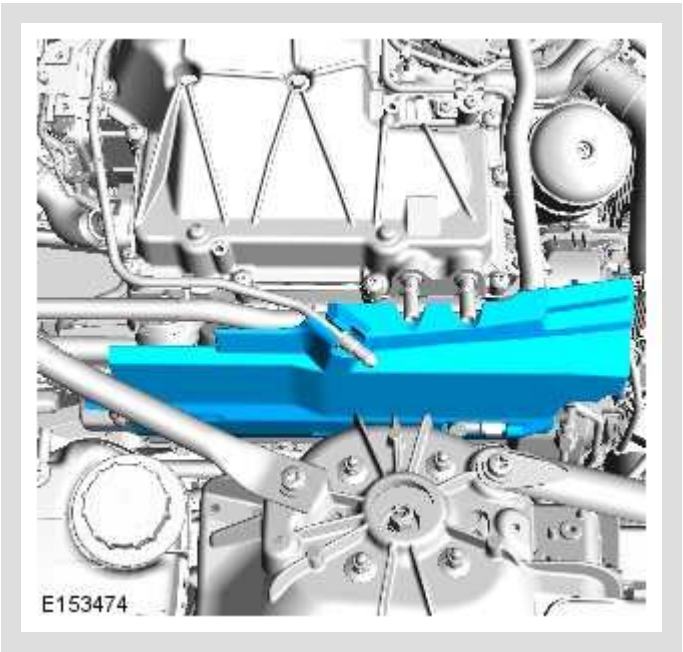


17.

cardiagn.com

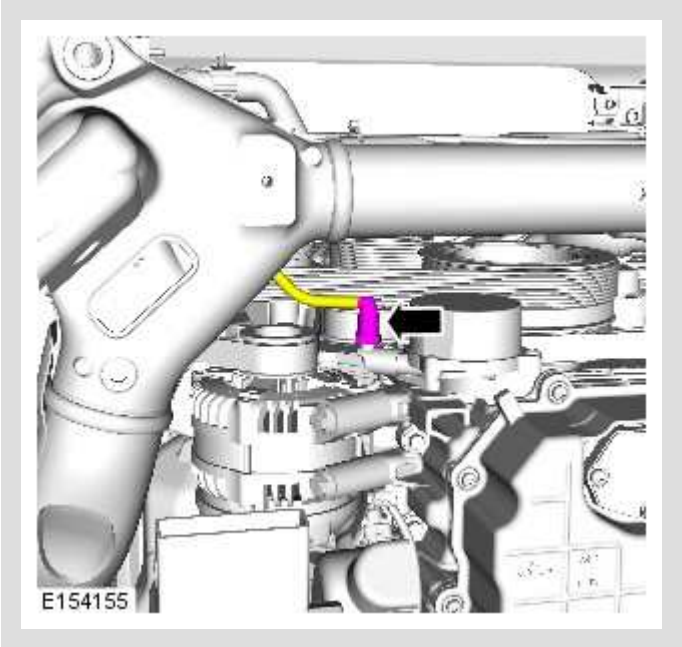


18.

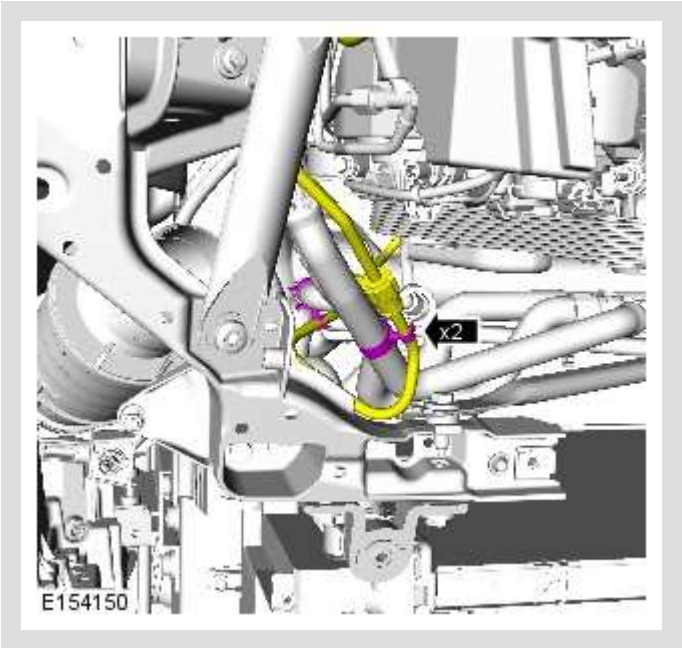


19.

cardiagn.com

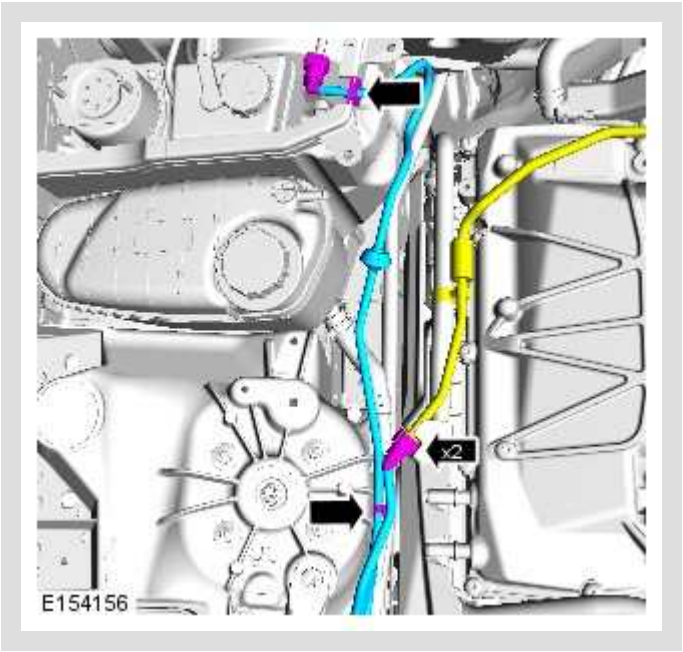


20.

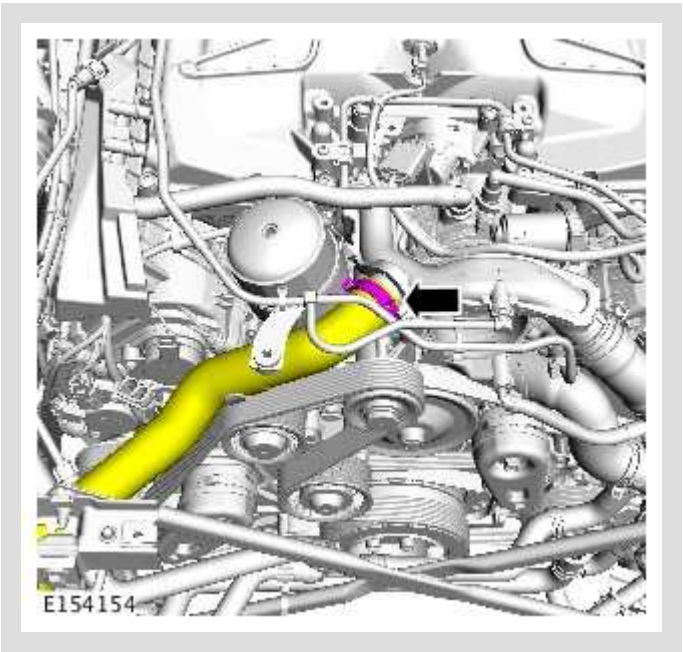


21.

cardiagn.com

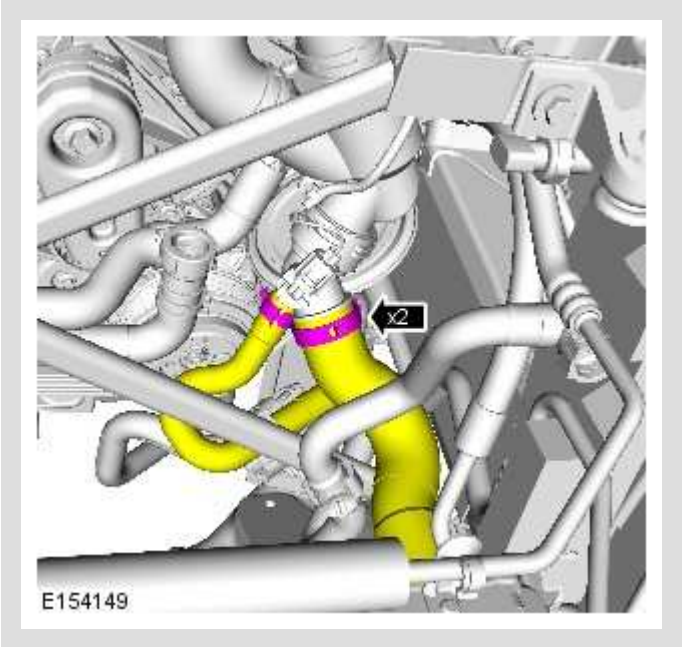


22.

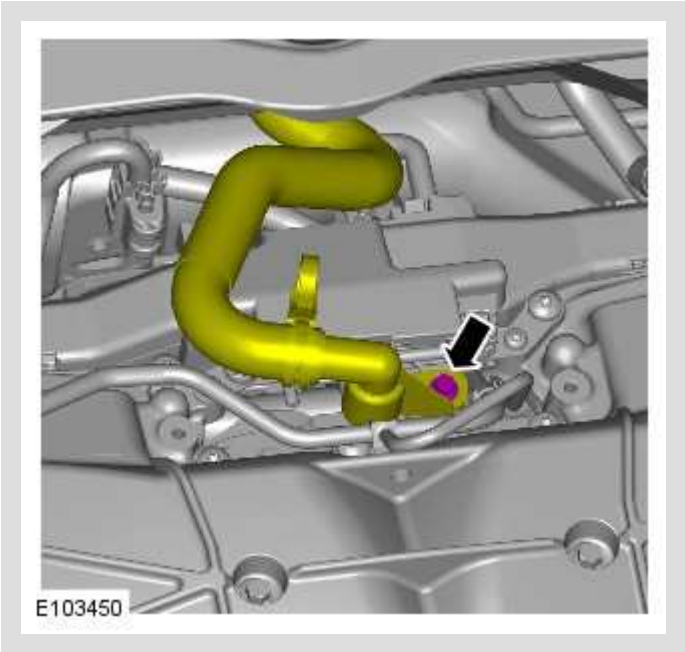


23.

cardiagn.com



24.

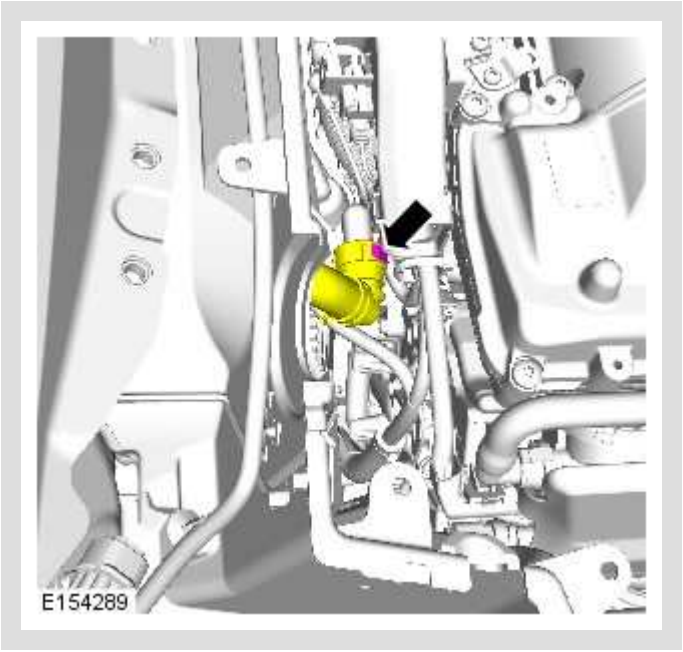


25.

NOTE:

Clamp the hose to minimize coolant loss.

cardiagn.com



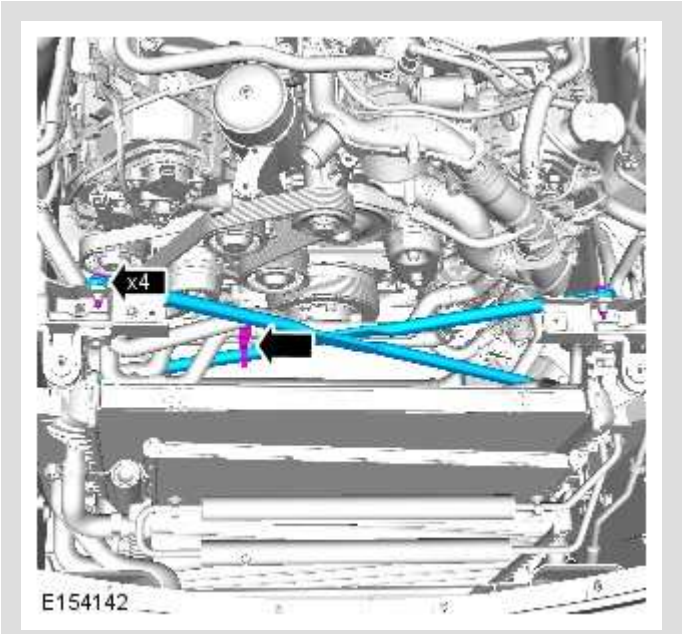
26.

NOTE:

Repeat the procedure for the other side.

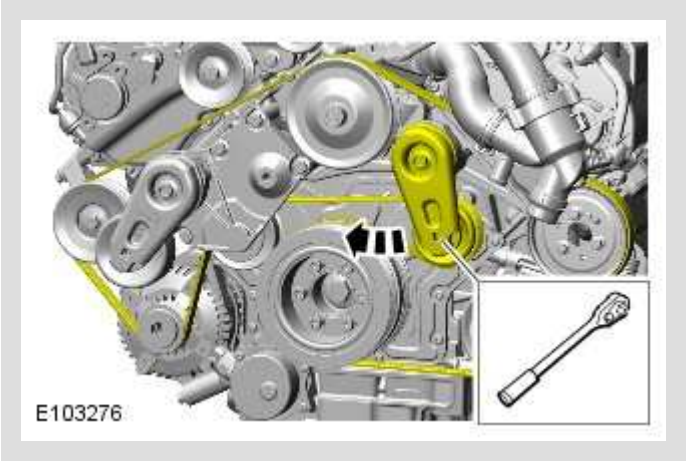
Refer to: Fender Splash Shield (501-02 Front End Body Panels, Removal and Installation).

27.



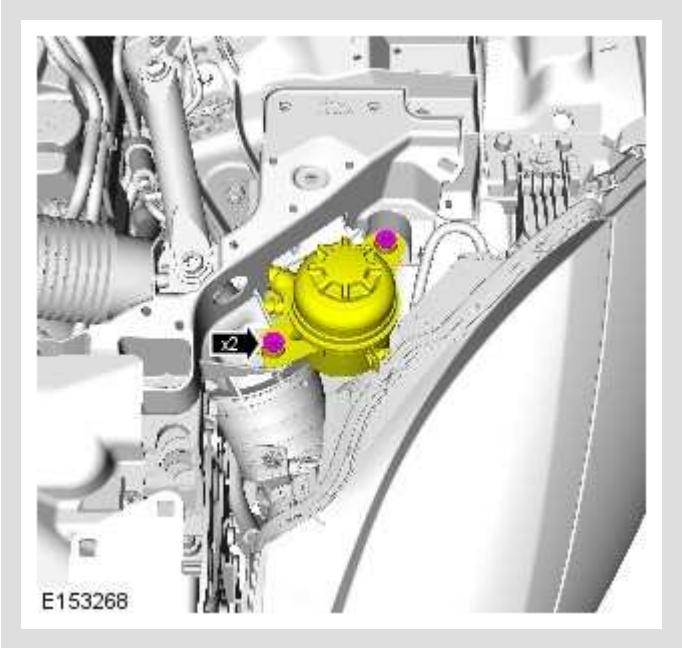
28.

cardiagn.com



29. Refer to: Power Steering System Filling (211-00 Steering System - General Information, General Procedures).

30.



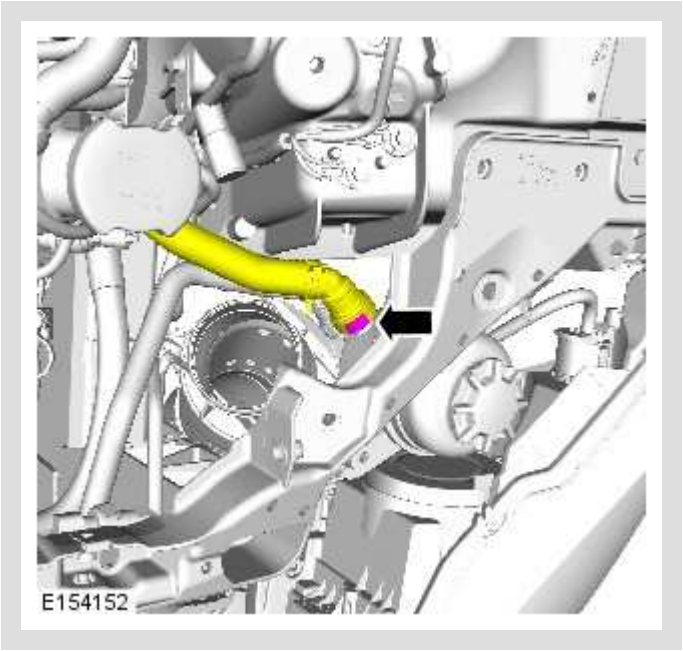
31.

CAUTIONS:

- Be prepared to collect escaping fluids.
- Before disconnecting or removing components, ensure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.

cardiagn.com

- If power steering fluid is spilt on the paintwork, the effected area must be immediately washed down with cold water. Failure to follow this instruction may result in damage to the vehicle.



32.

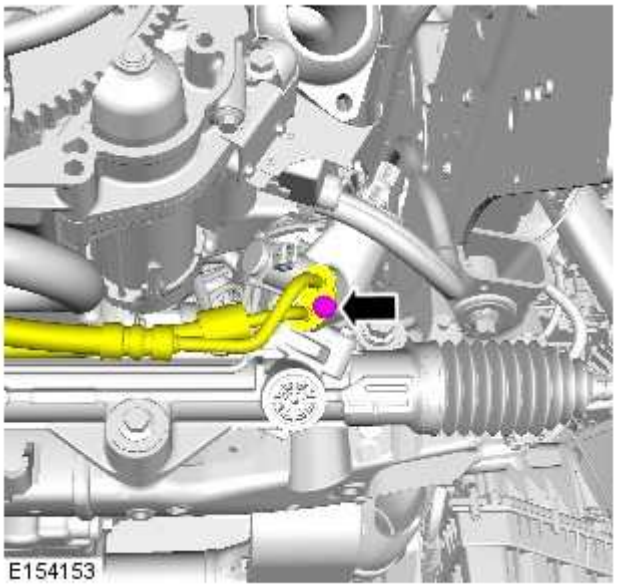
CAUTIONS:

- Before disconnecting or removing components, ensure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.
- If power steering fluid is spilt on the paintwork, the effected area must be immediately washed down with cold water. Failure to follow this instruction may result in damage to the vehicle.
- Cap the power steering line to prevent loses of fluid and dirt ingress.

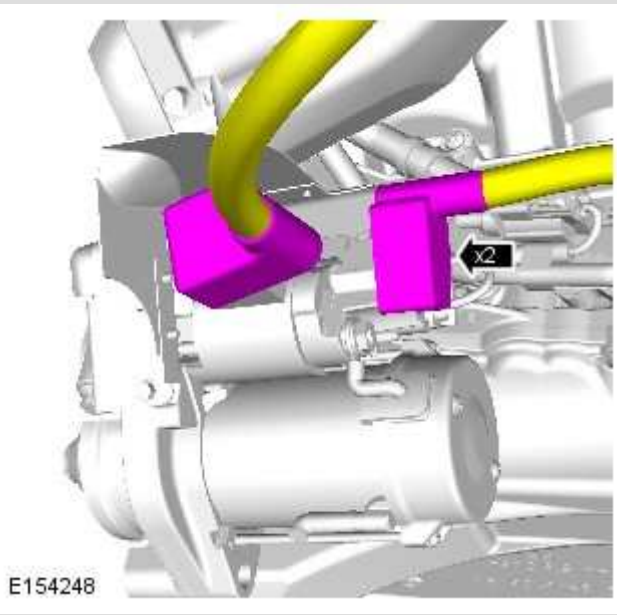
NOTE:

Remove and discard the O-ring seals.

cardiagn.com

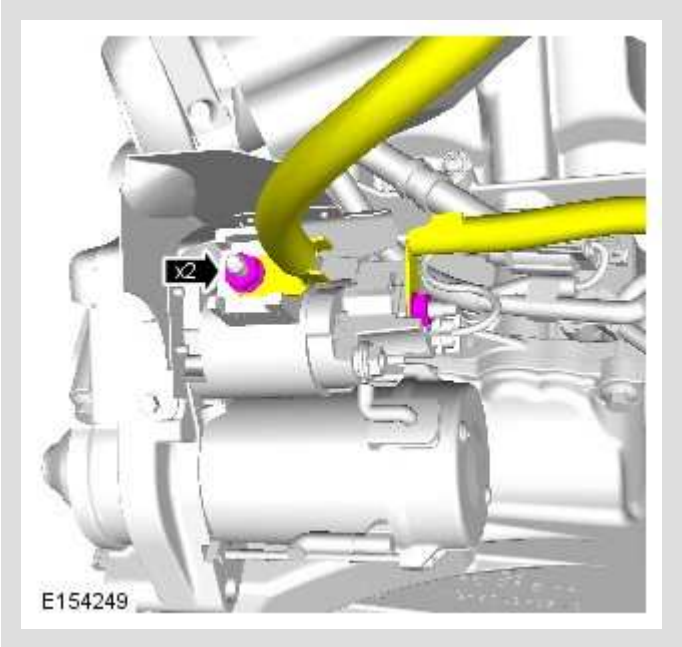


33.

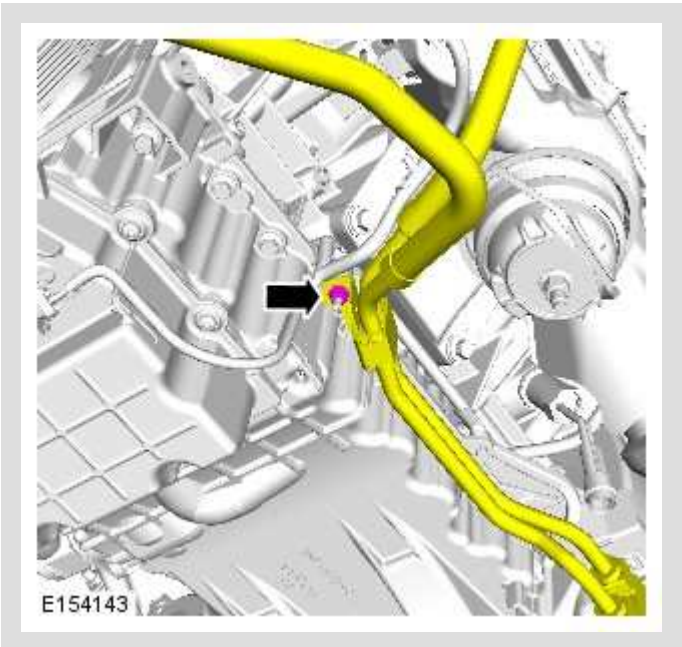


34.

cardiagn.com

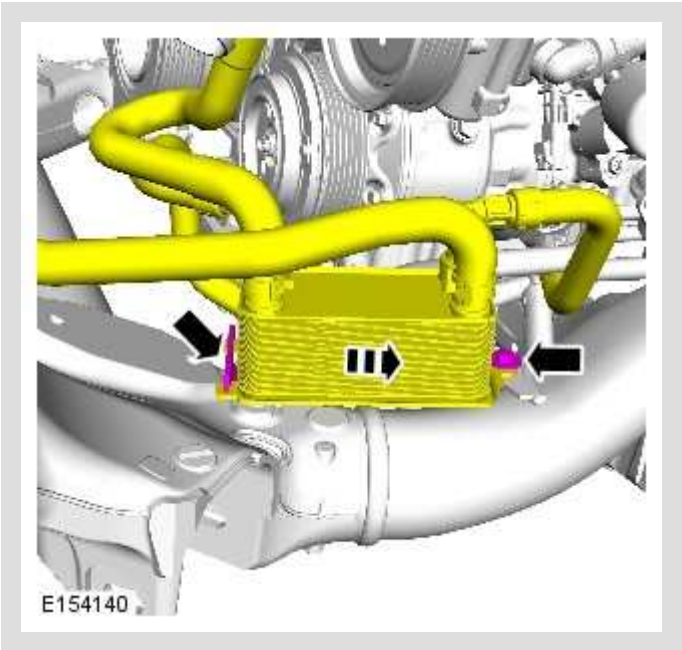


35.

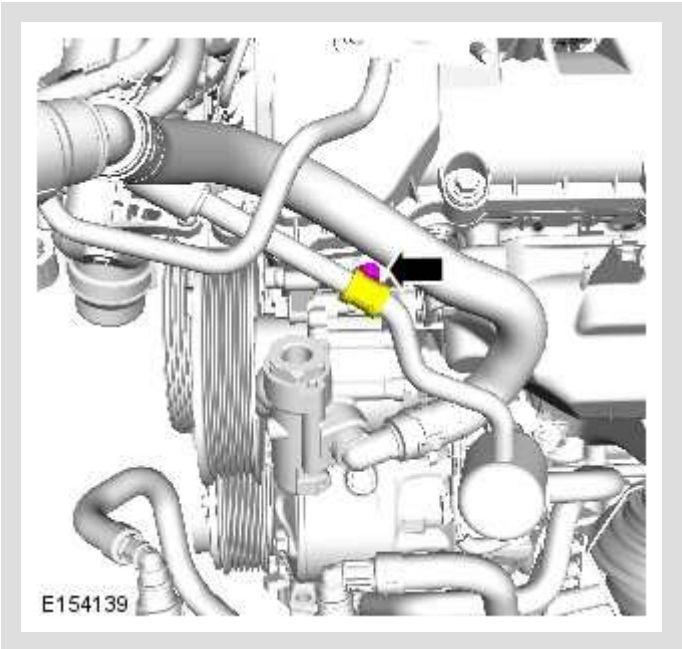


cardiagn.com

36.

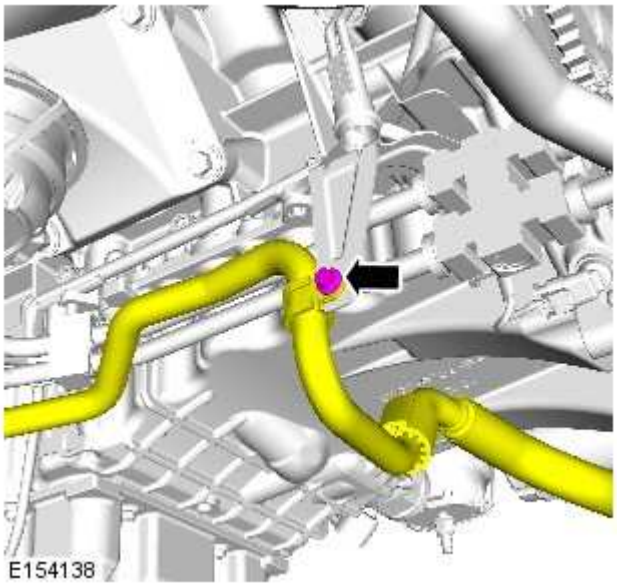


37.

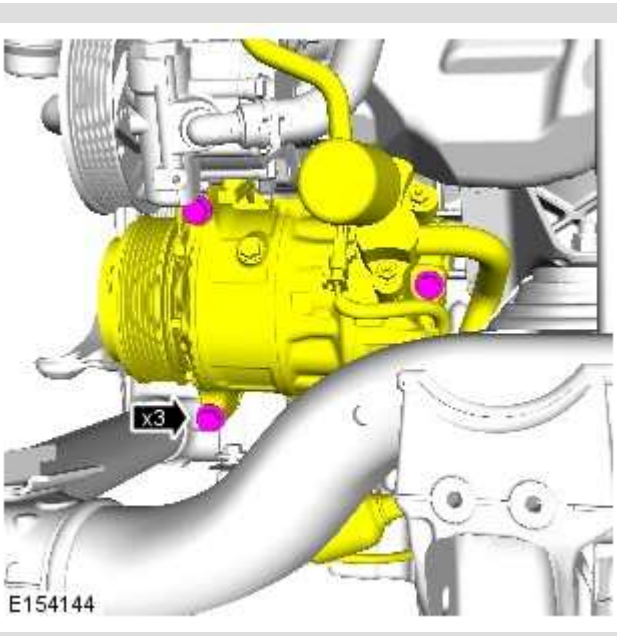


38.

cardiagn.com

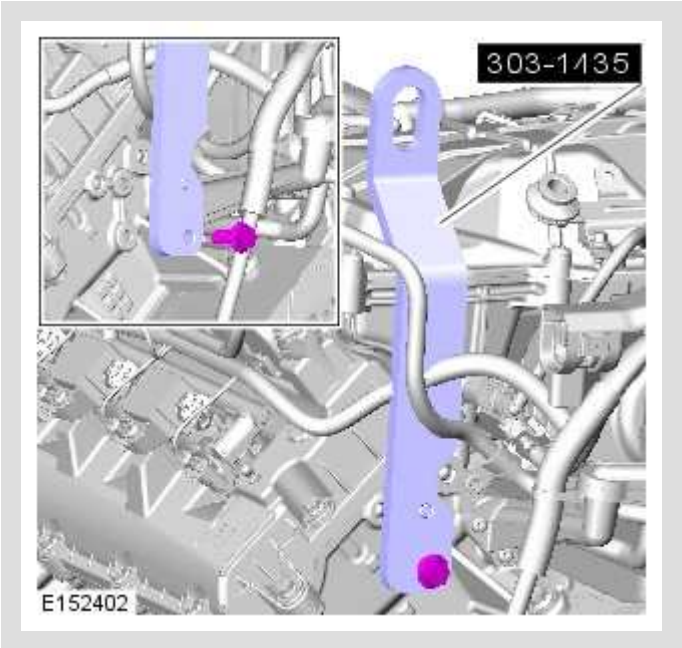


39.



cardiagn.com

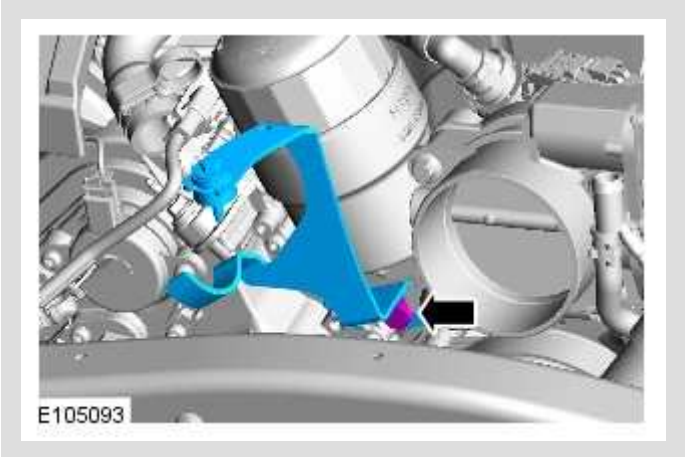
40.



Special Tool(s): 303-1435

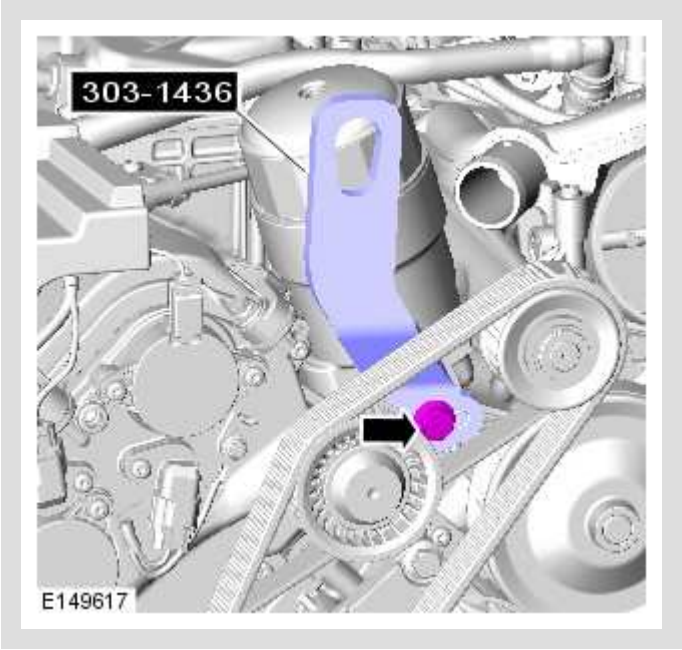
Torque: **25 Nm**

41.



42.

cardiagn.com

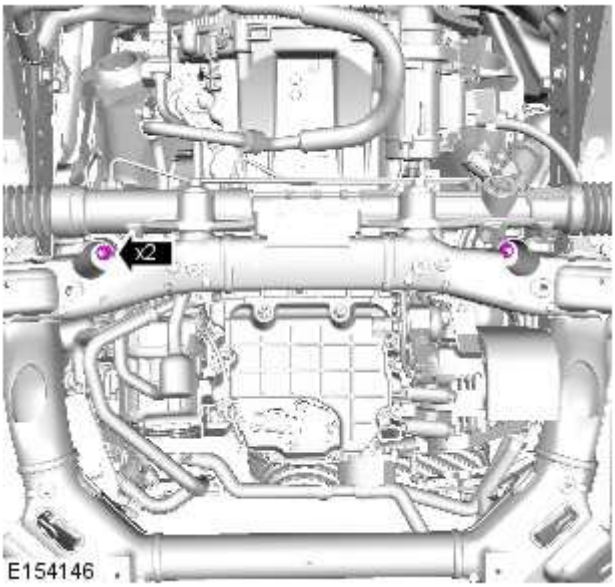


Special Tool(s): 303-1436

Torque: **25 Nm**

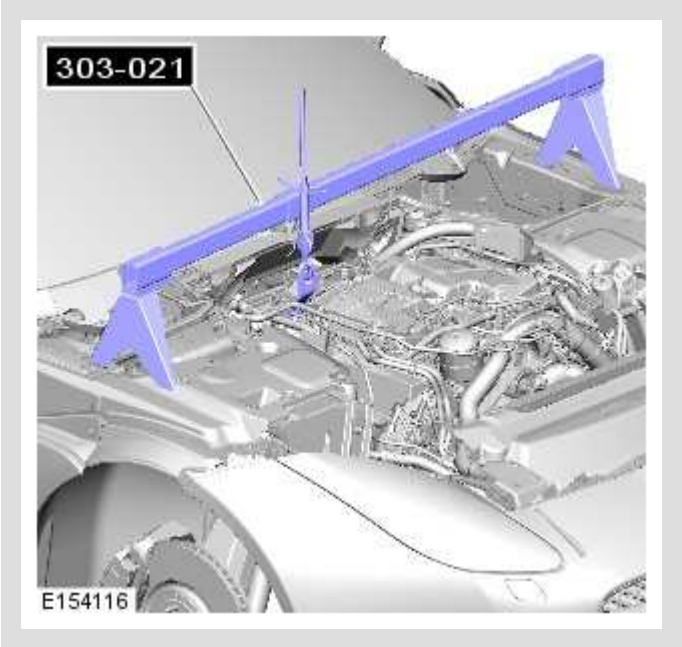
43.

cardiagn.com



44.

cardiagn.com



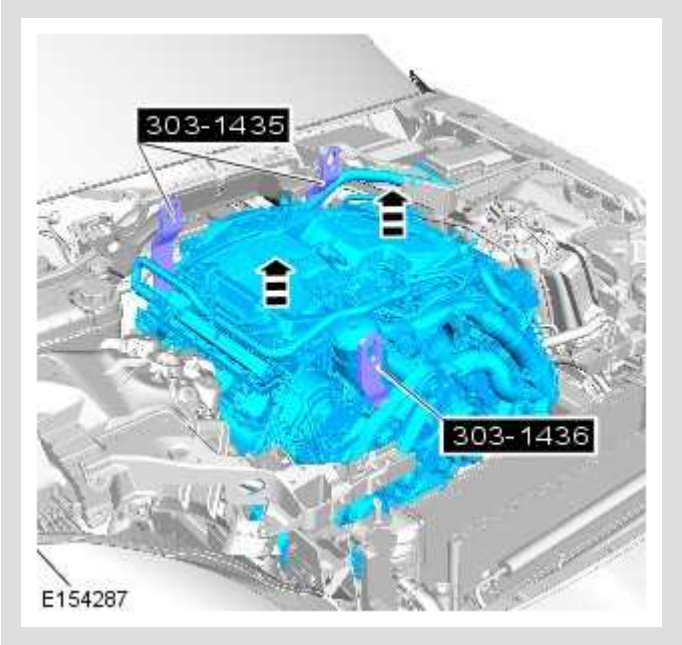
Remove the special tool.

Special Tool(s): 303-021

45.

NOTE:

This step requires the aid of another technician.



Using a suitable tool, remove the engine.

Special Tool(s): 303-1435 , 303-1436

cardiagn.com

2015.0 F-TYPE (X152), 303-12

INTAKE AIR DISTRIBUTION AND FILTERING - V8 S/C 5.0L PETROL

AIR CLEANER OUTLET INTERMEDIATE PIPE LH

(G1581640)

REMOVAL AND INSTALLATION

19.10.37	AIR CLEANER OUTLET INTERMEDIATE PIPE - LEFT HAND -RENEW	ALL DERIVATIVES	0.2	USED WITHINS	

REMOVAL

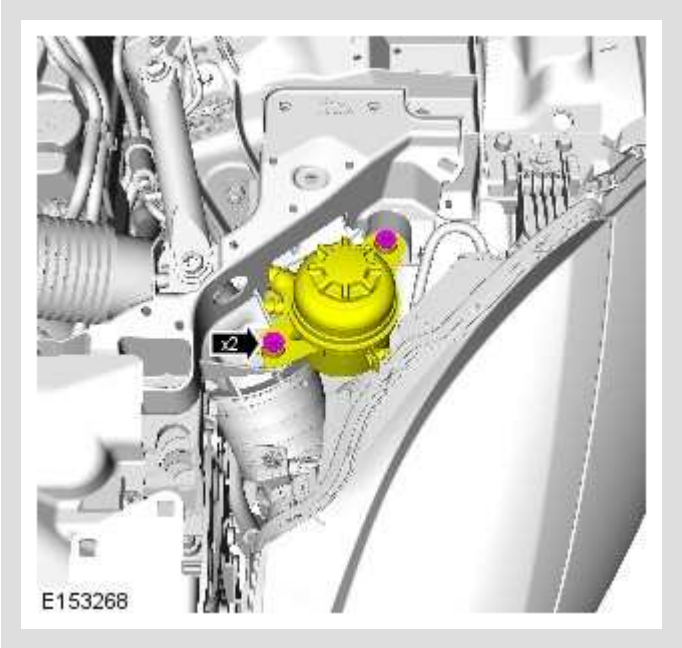
NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

2.

cardiagn.com



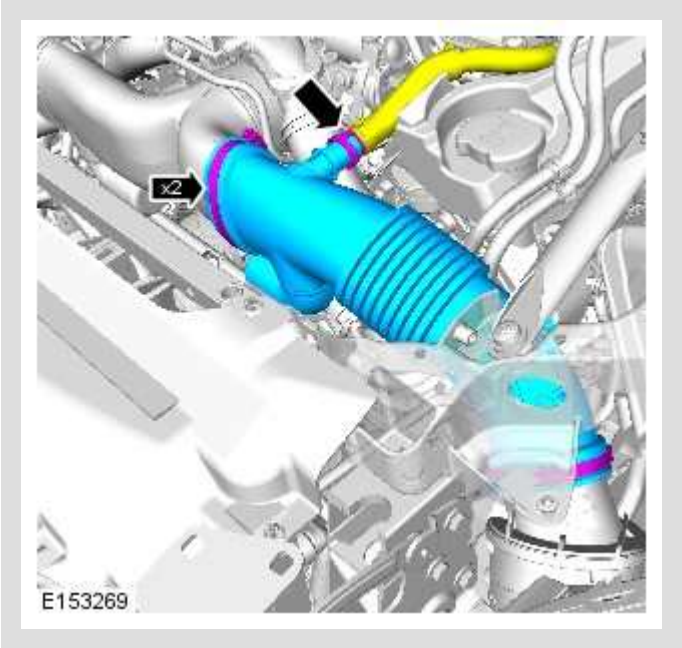
Torque: **9 Nm**

3.

NOTE:

Make sure that the clamps are fitted in the position shown.

cardiagn.com



Torque: **3.3 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

AIR CLEANER OUTLET PIPE T-CONNECTOR (G1580352)

REMOVAL AND INSTALLATION

19.10.39	AIR CLEANER OUTLET PIPE T-CONNECTOR - RENEW	ALL DERIVATIVES	0.1	USED WITHINS	

REMOVAL

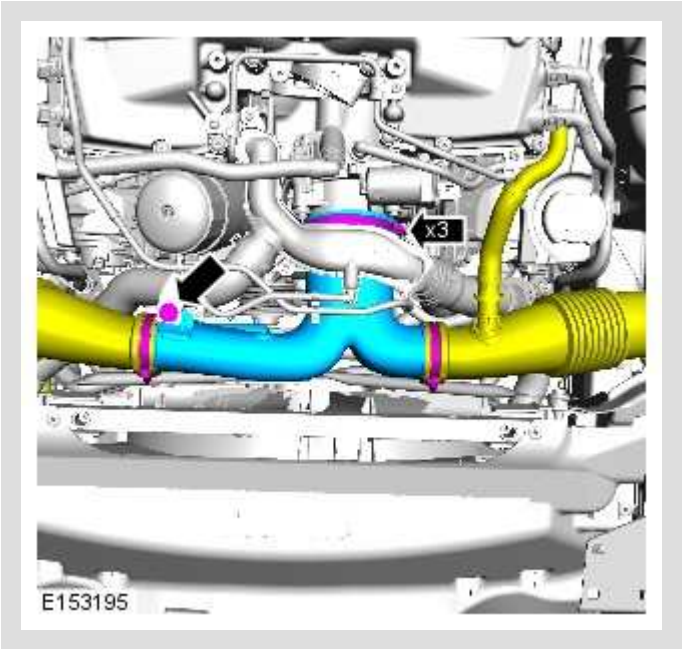
NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

2.

cardiagn.com



Torque:

M6 **9 Nm**

Air Intake Pipe to T-Connector Clamps **3.3 Nm**

T-Connector to Throttle Body Clamp **4.1 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

ENGINE COOLING - V8 S/C 5.0L PETROL

COOLING FAN MOTOR AND SHROUD (G1580408)

REMOVAL AND INSTALLATION

26.25.11	FAN COWL - RENEW	ALL DERIVATIVES	0.9	USED WITHINS

REMOVAL

CAUTION:

Always protect the cooling pack elements to prevent accidental damage.

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some components shown removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

cardiagn.com

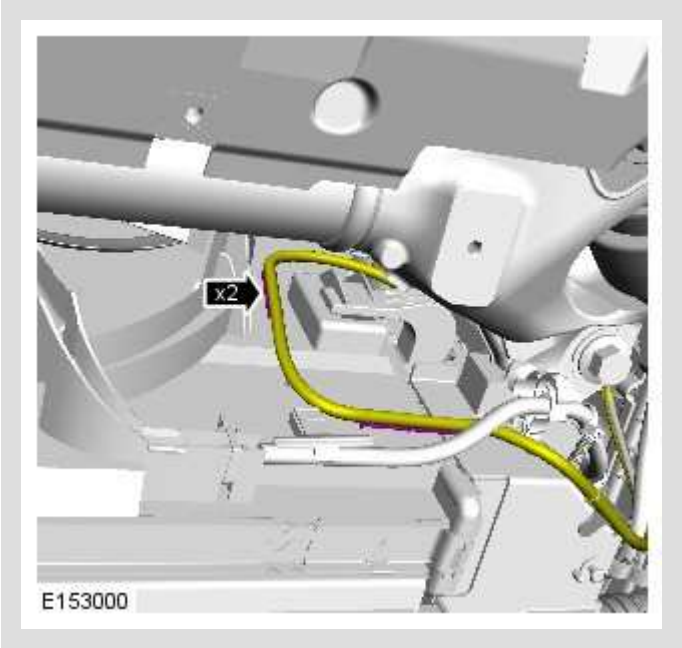
3. **WARNING:**

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

4. **NOTE:**

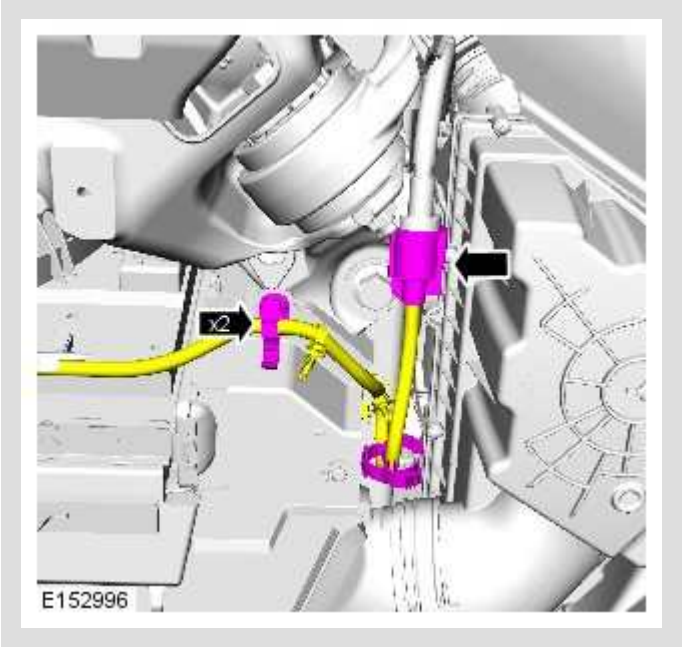
Some components shown removed for clarity.



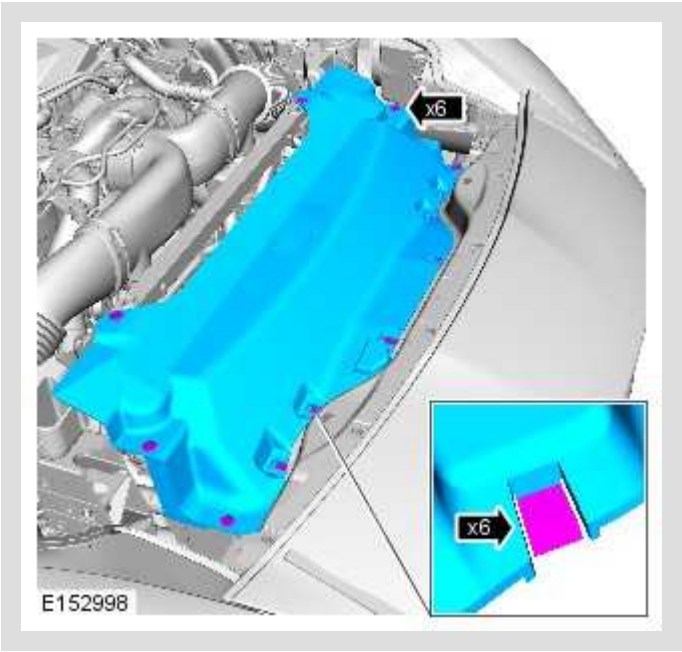
5. **NOTE:**

Some components shown removed for clarity.

cardiagn.com

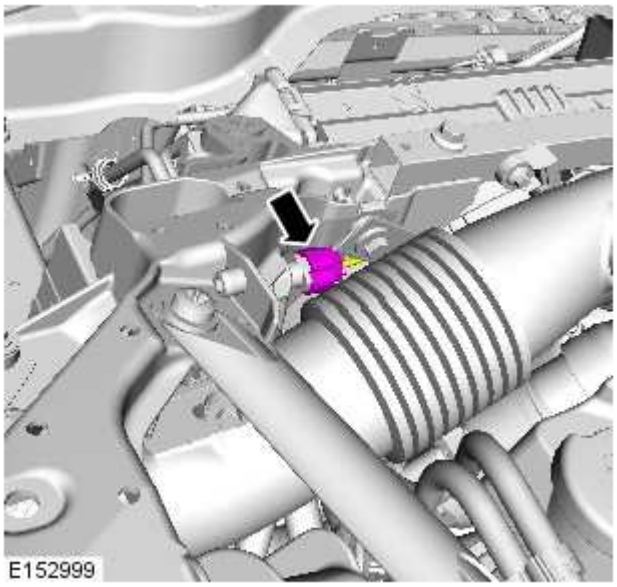


6.

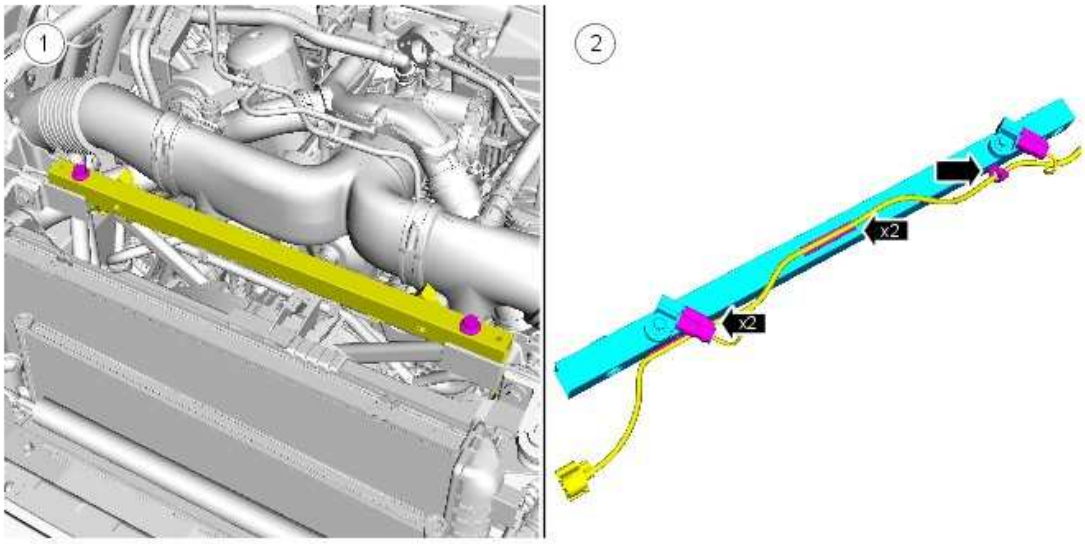


7.

cardiagn.com



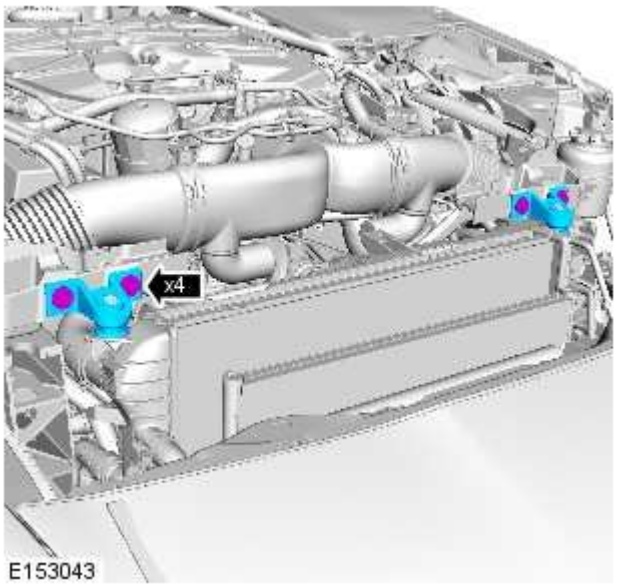
8.



Torque: **25 Nm**

9.

cardiagn.com

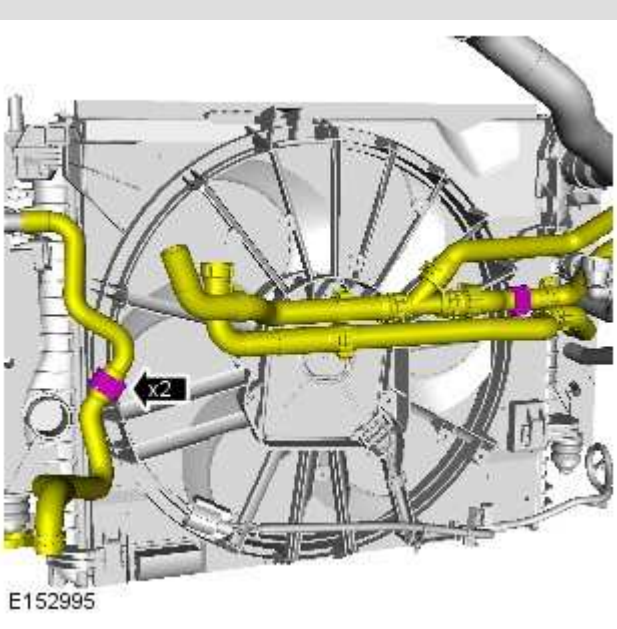


Torque: **25 Nm**

10.

NOTE:

Component shown removed for clarity.

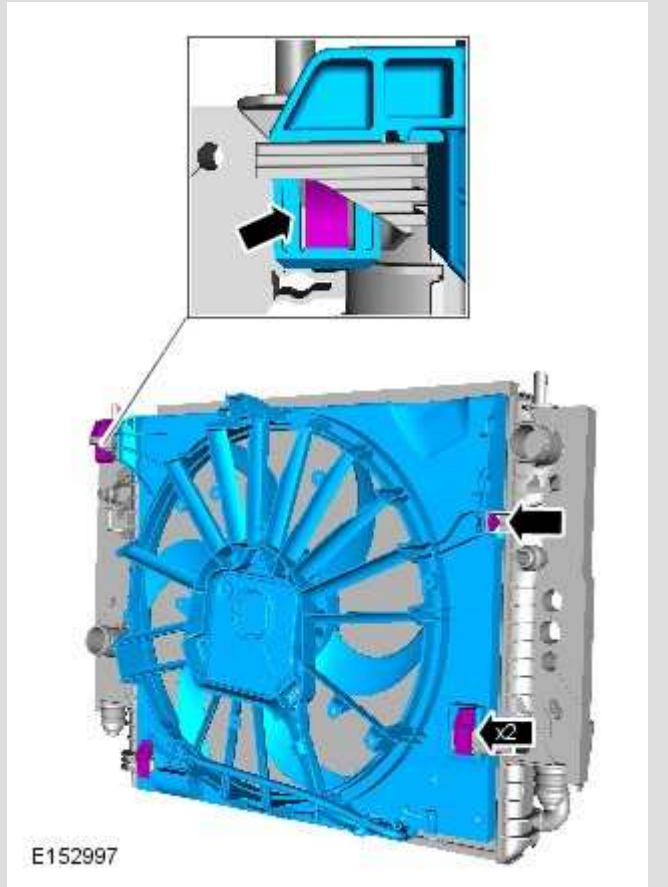


11.

NOTE:

cardiagn.com

Component shown removed for clarity.



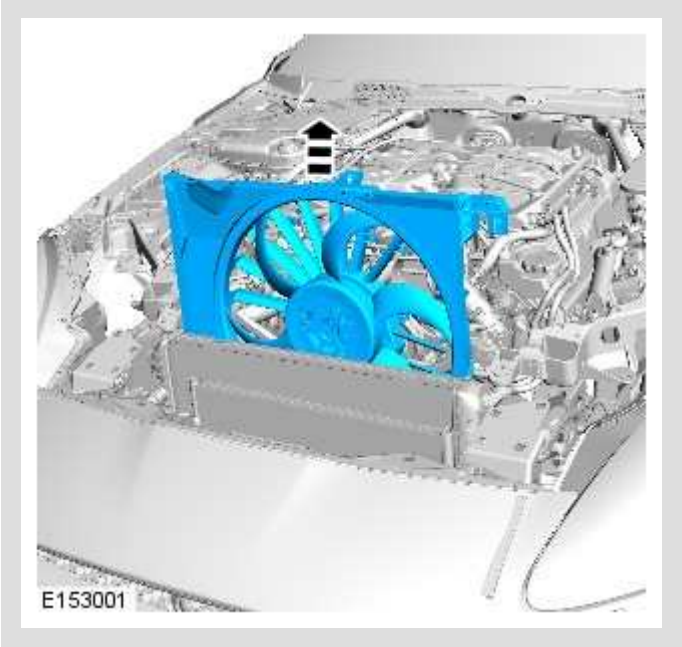
Torque: **7 Nm**

12.

CAUTION:

Always protect the cooling pack elements to prevent accidental damage.

cardiagn.com



INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

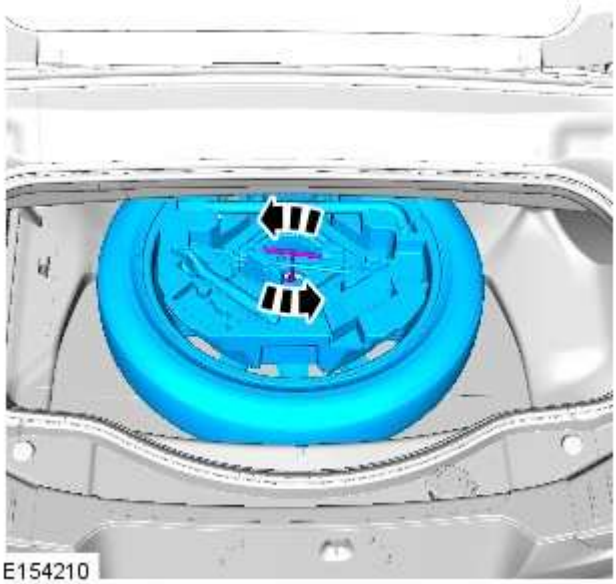
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

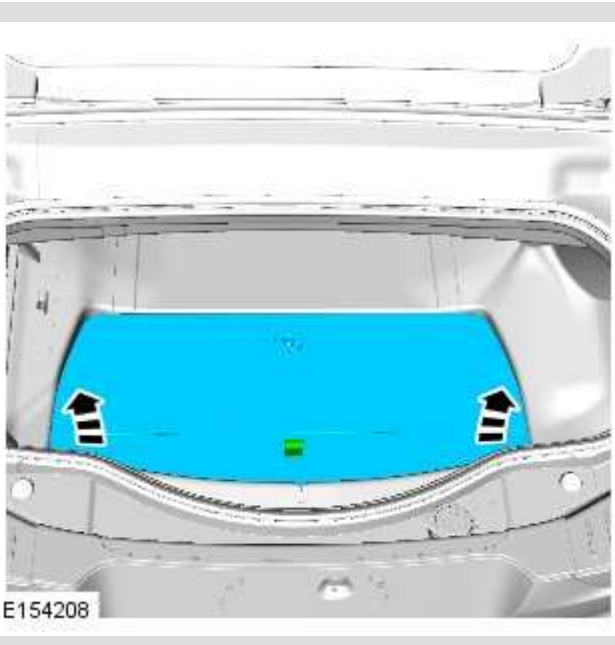
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

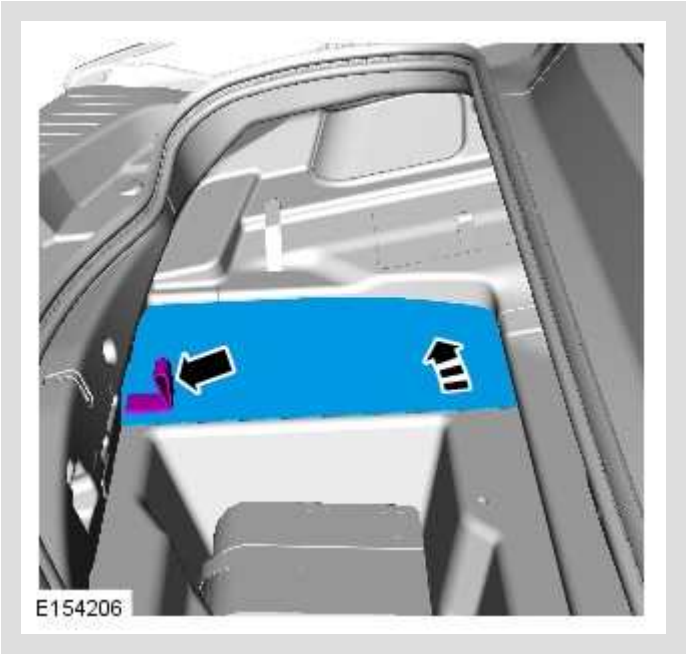


4.



cardiagn.com

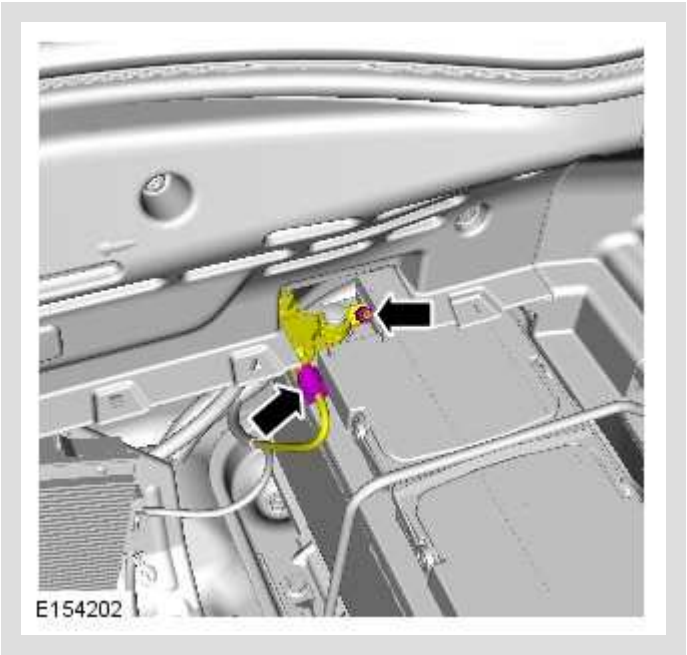
5.



6.

CAUTION:

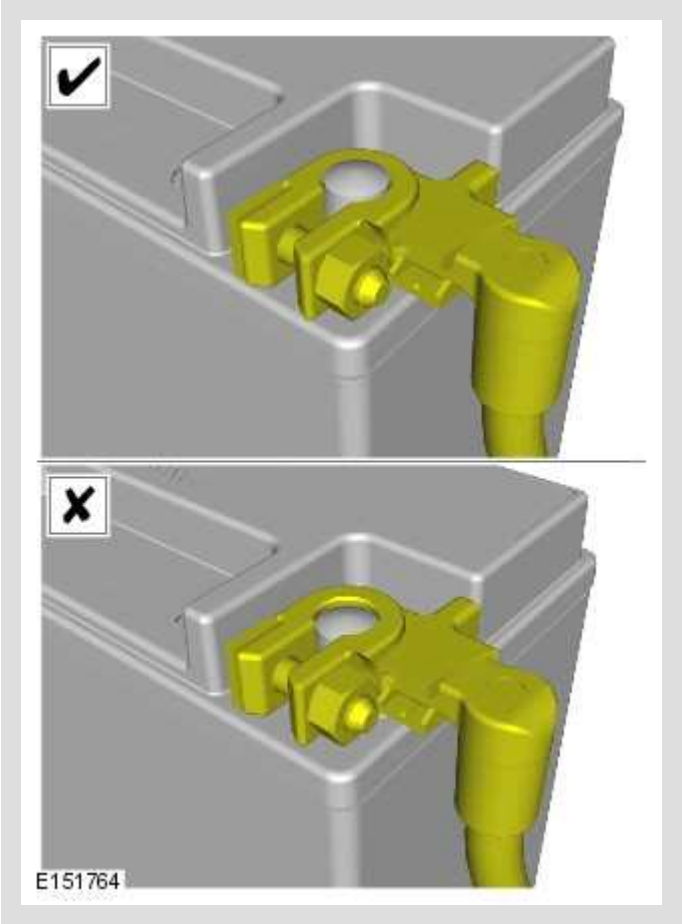
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

cardiagn.com

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

2015.0 F-TYPE (X152), 501-02

FRONT END BODY PANELS

FENDER SPLASH SHIELD (G1580215)

REMOVAL AND INSTALLATION

76.10.90	FRONT WHEEL ARCH LINER - RENEW	ALL DERIVATIVES	0.4	USED WITHINS	
76.10.90	FRONT WHEEL ARCH LINER - RENEW	SVR	0.4	USED WITHINS	

REMOVAL

△ NOTES:

- Removal steps in this procedure may contain installation details.

cardiagn.com

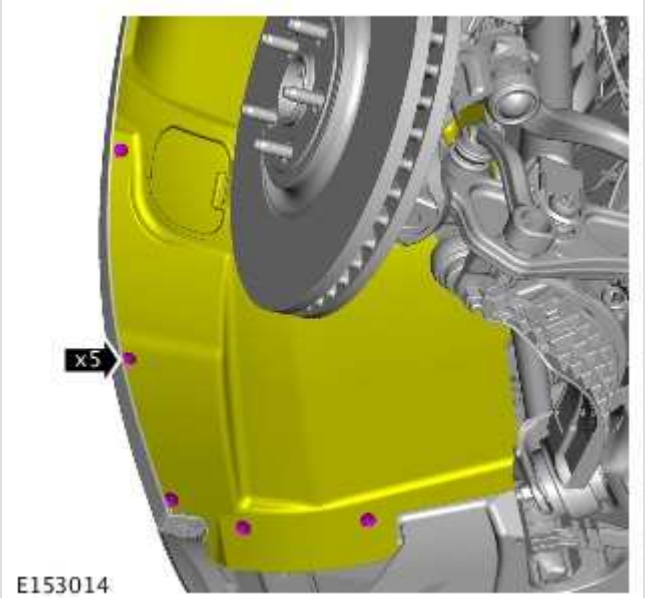
- LH illustration shown, RH is similar.

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

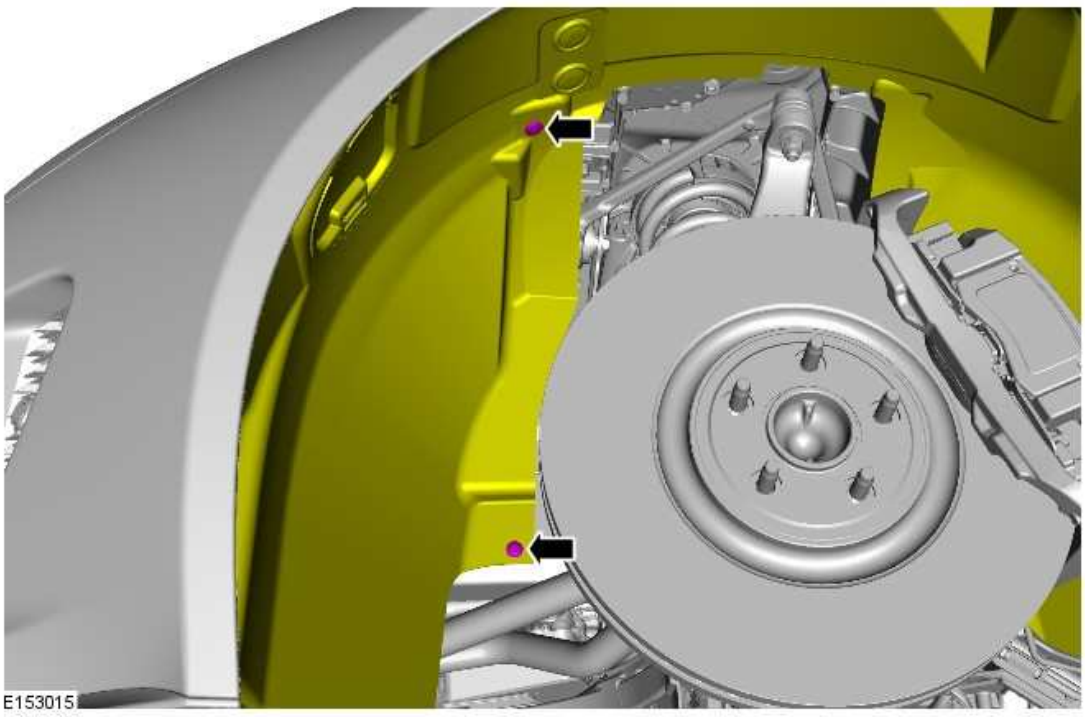
   Raise and support the vehicle.

2. Refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

3. 

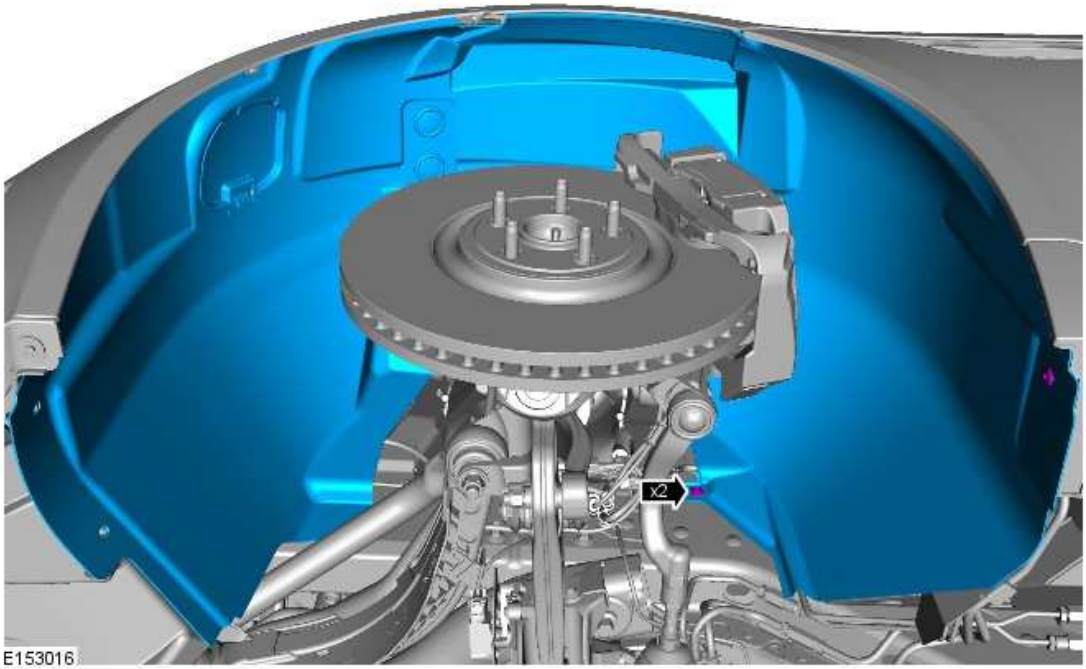
4.

cardiagn.com



5.

cardiagn.com



INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

TRANSMISSION (G1579985)

INSTALLATION

37.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	3.6	USED WITHINS	
44.20.01	TRANSMISSION ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	4.9	USED WITHINS	
44.20.01.90	TRANSMISSION ASSEMBLY - REMOVE FOR ACCESS, AND INSTALL	3000 CC, AJ V6 (AJ126), 2WD	4.7	USED WITHINS	
86.75.50	FRONT SEAT TRACK MOTOR - RENEW	ALL DERIVATIVES	0.5	USED WITHINS	

INSTALLATION

SPECIAL TOOL(S)

cardiagn.com

	303-021 Engine support bracket

	303-1435 Engine Lifting Brackets Rear

NOTES:

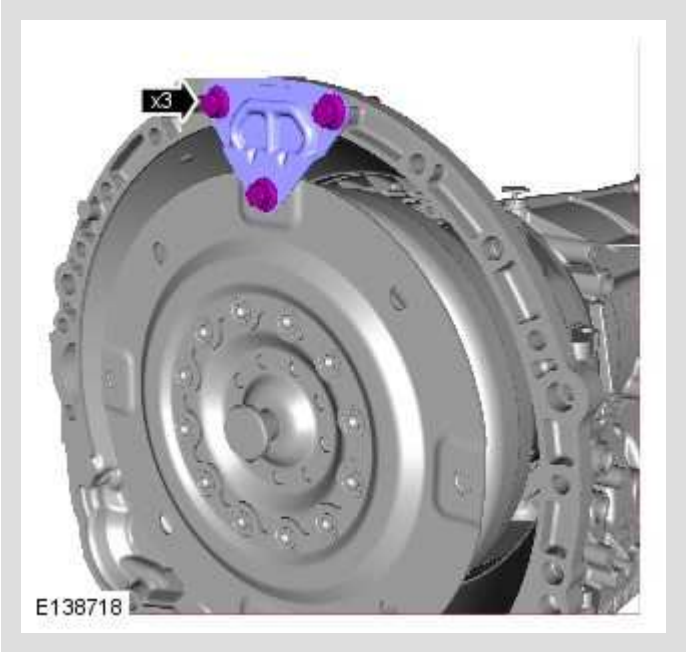
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the transmission removed for clarity.

1.

NOTE:

This step is only required if a new component is installed.

cardiagn.com



2.

NOTE:

Make sure that the torque converter is fully engaged to the transmission.

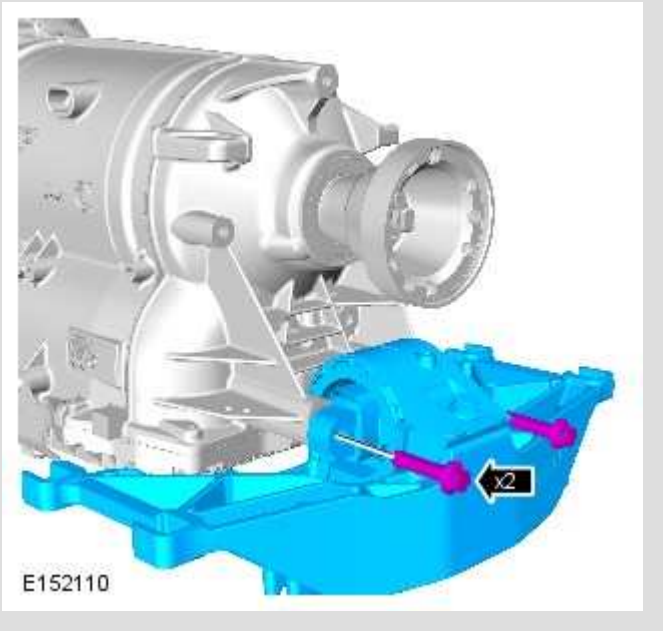
cardiagn.com

3.

NOTE:

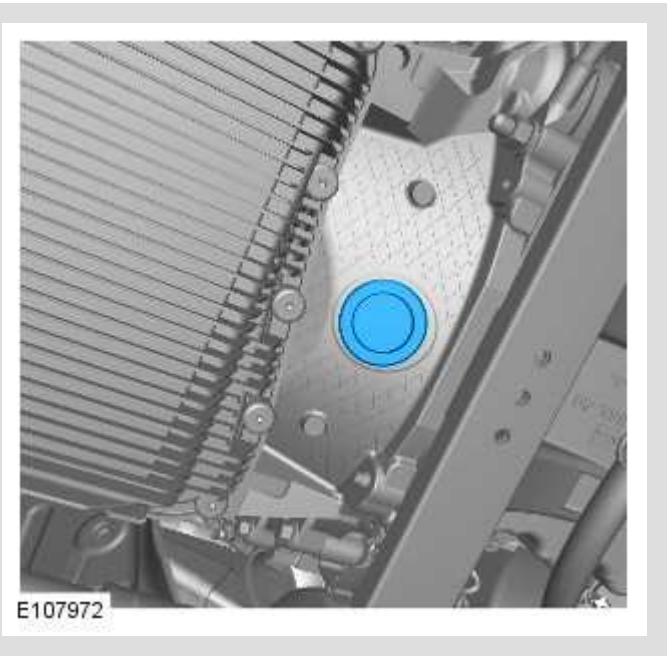
cardiagn.com

This step is only required if previously removed.



Torque: **48 Nm**

4.

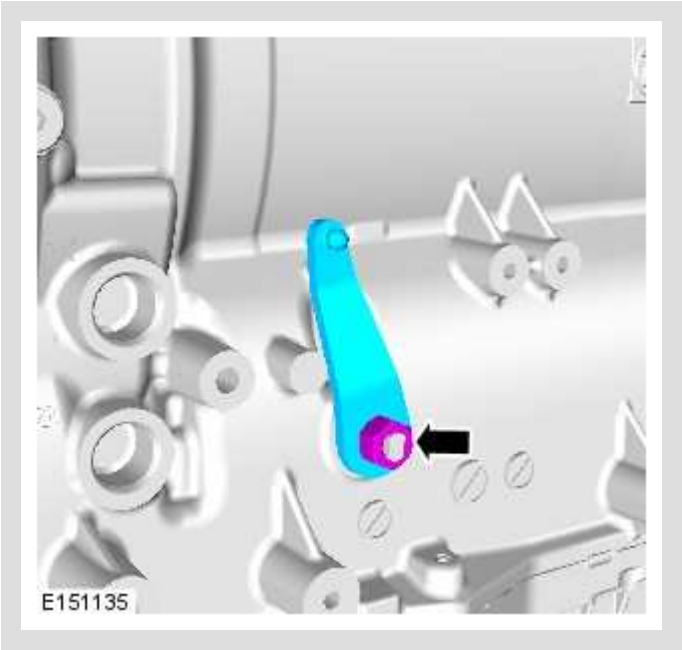


5.

NOTE:

This step is only required if a new component is installed

cardiagn.com



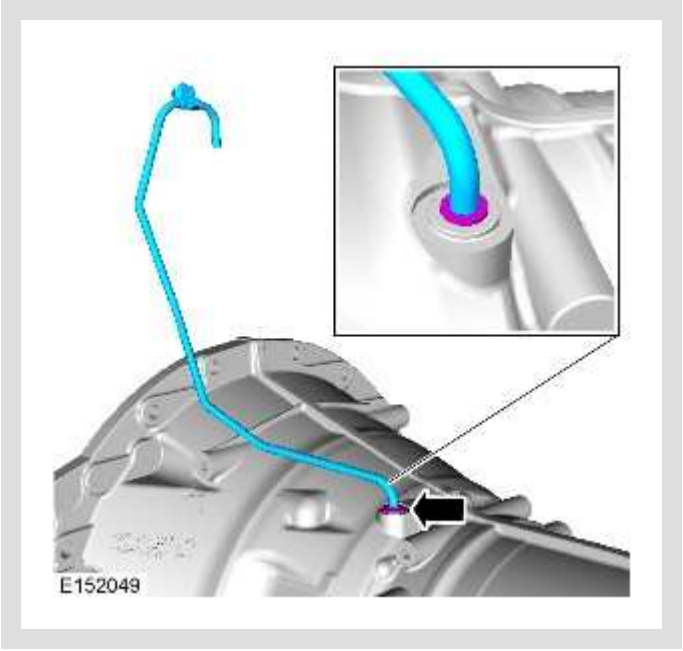
Torque: **12 Nm**

6.

CAUTION:

To prevent water ingress and subsequent transmission damage, make sure that the breather is fully pushed home into the transmission casing. The white line around the circumference of the pipe should not be visible when correctly installed.

cardiagn.com



7.

WARNINGS:

This step requires the aid of another technician.

Make sure that the transmission is secured with suitable retaining straps.

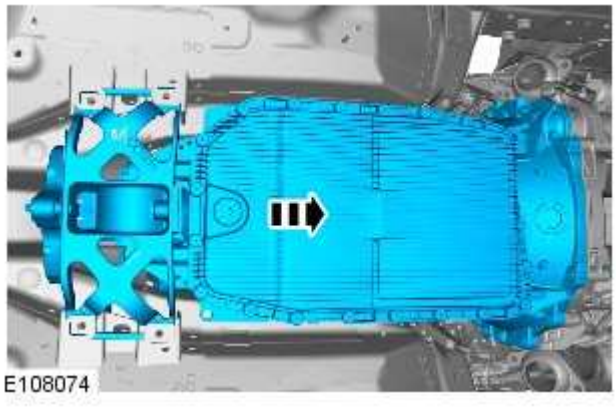
CAUTIONS:

cardiagn.com

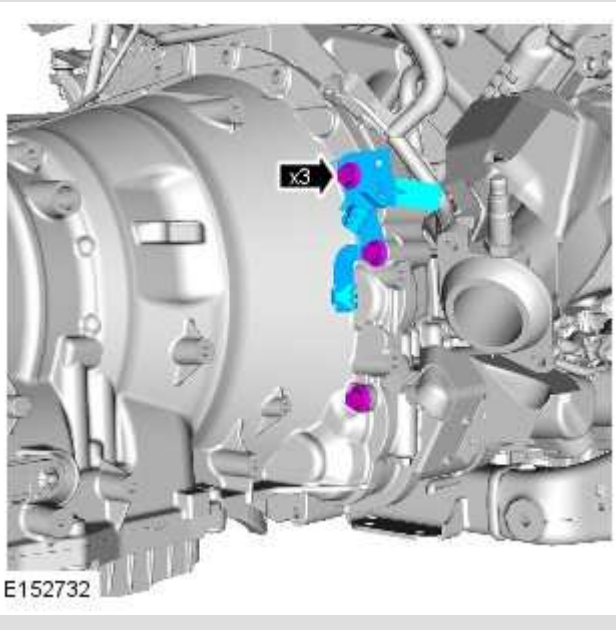
Make sure that the torque converter remains in the transmission.

Remove and discard the cable ties securing the torque converter.

Apply grease of the correct specification to the torque converter spigot.



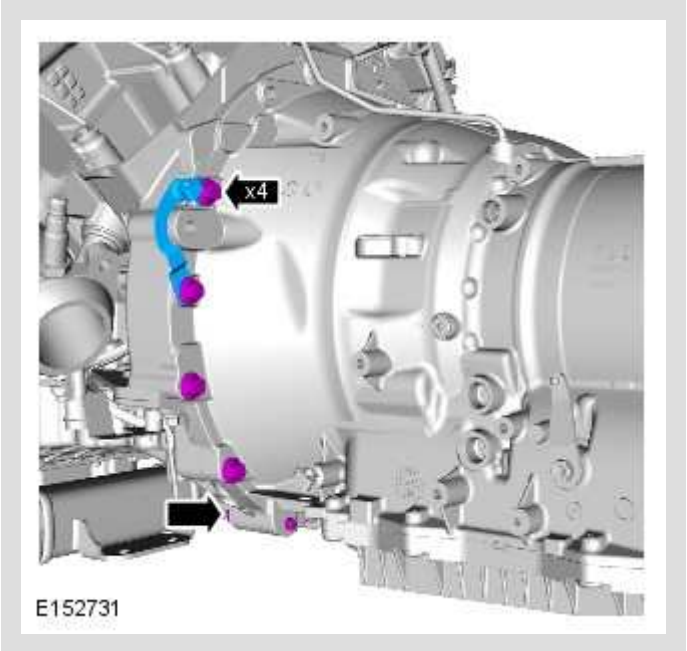
8.



Torque: **48 Nm**

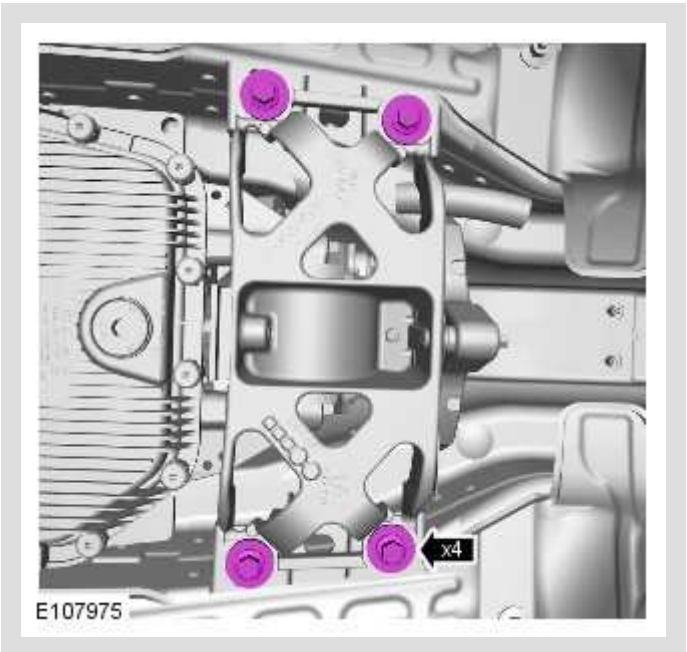
9.

cardiagn.com



Torque: **48 Nm**

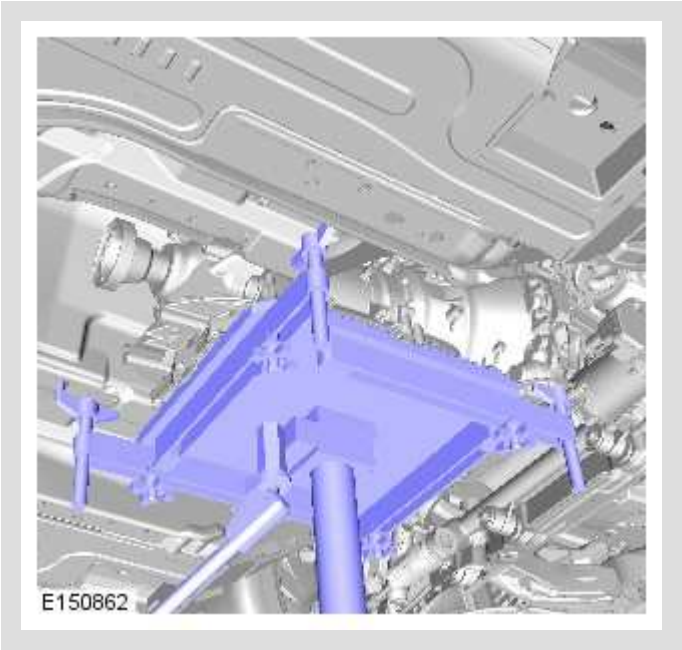
10.



Torque: **45 Nm**

11.

cardiagn.com

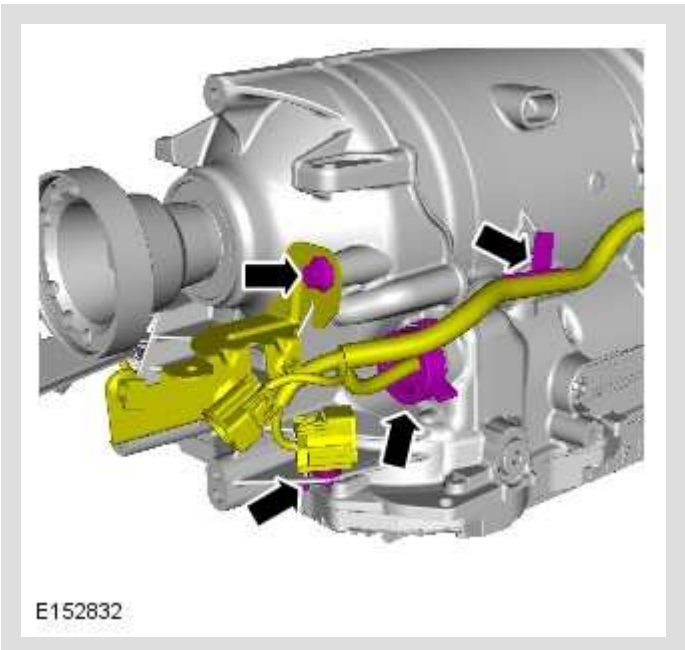


Remove the jack supporting the transmission.

12.

CAUTION:

If necessary, install new clips.



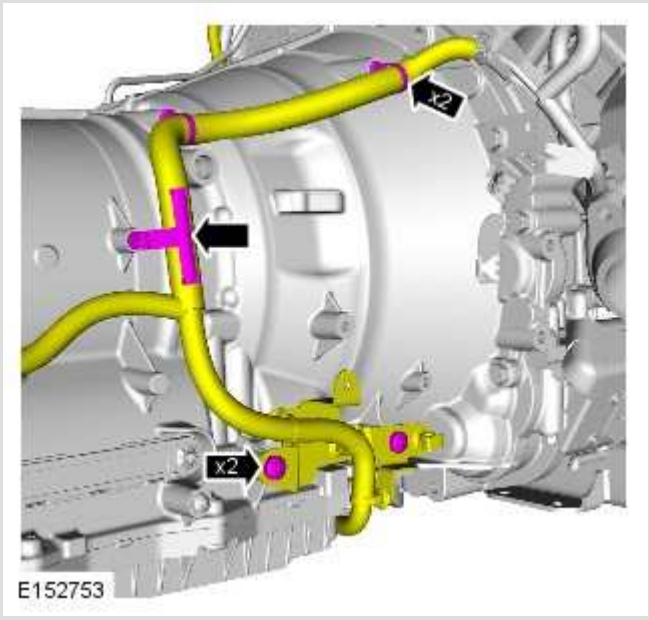
cardiagn.com

Torque: **15 Nm**

13.

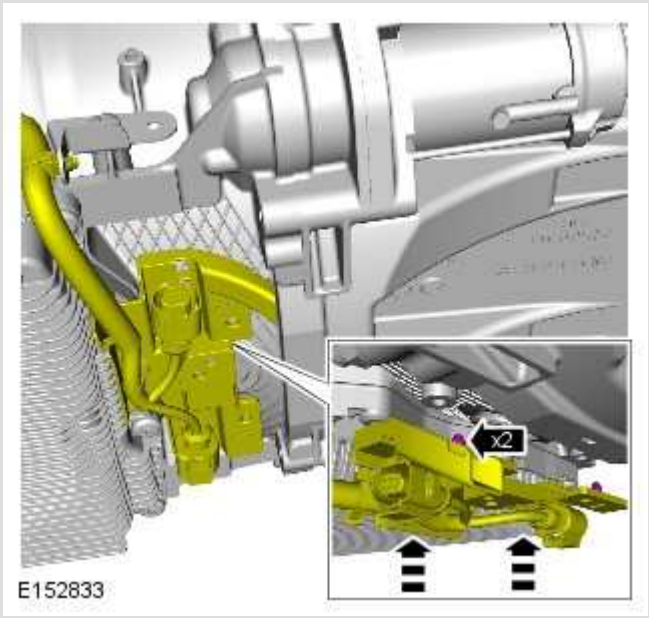
CAUTION:

If necessary, install new clips.



Torque: **15 Nm**

14.

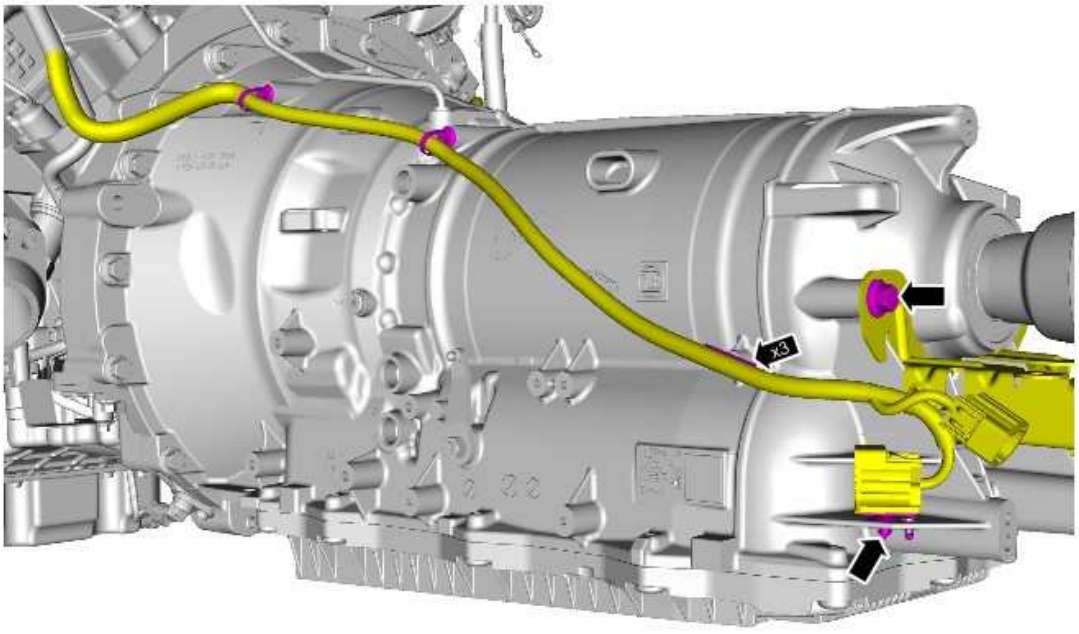


15.

CAUTION:

cardiagn.com

If necessary, install new clips.



Torque: **12 Nm**

16.

CAUTION:

Secure with a cable tie.

cardiagn.com

17.

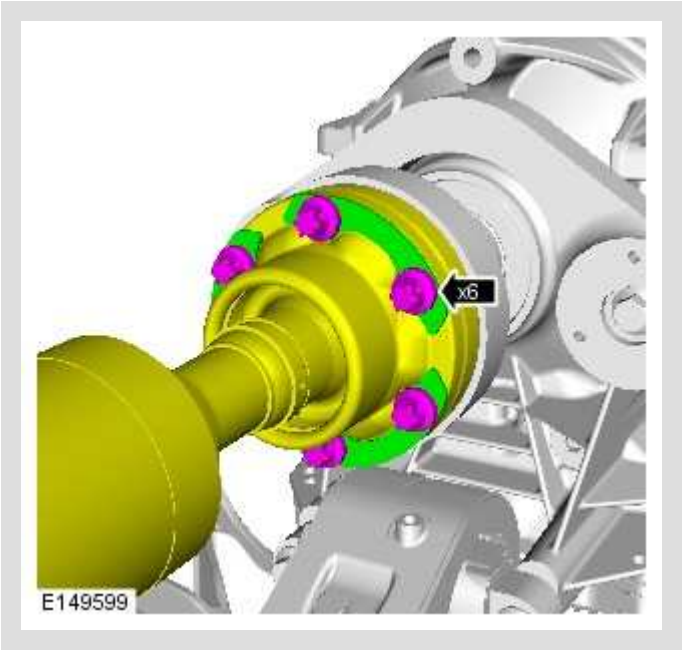
CAUTION:

Make sure that new bolts are installed.

NOTE:

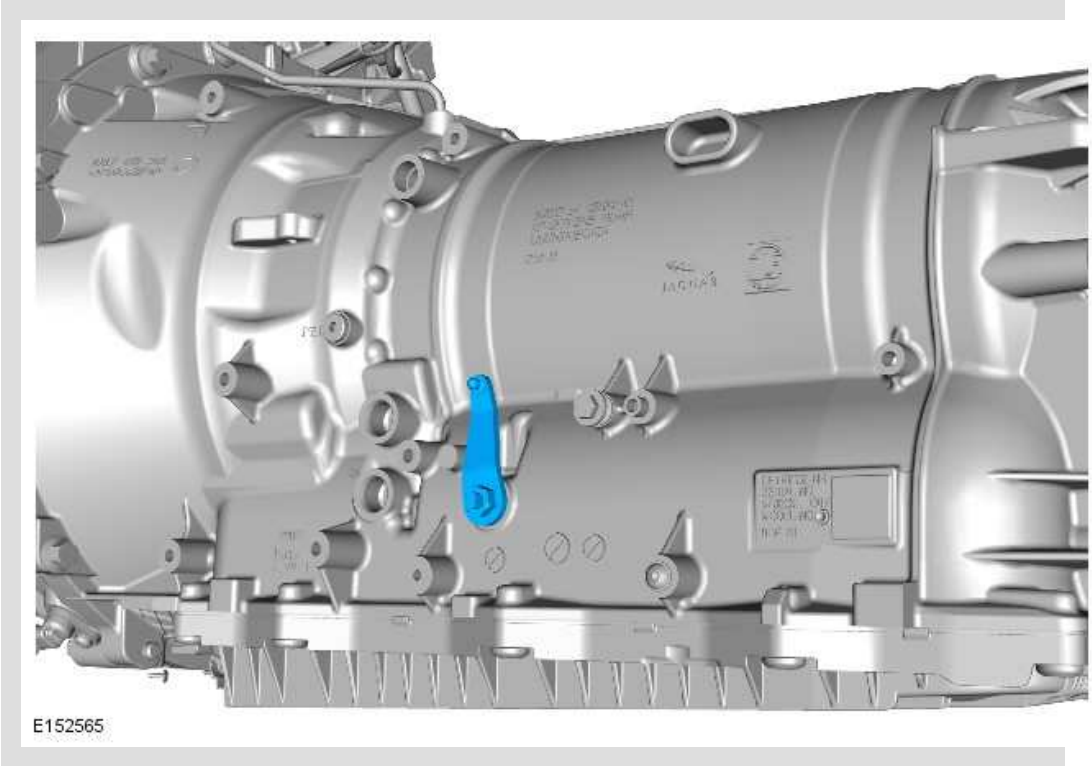
Make sure that you re-align the driveshaft to the transmission flange using the alignment mark.

cardiagn.com



Torque: **75 Nm**

18.



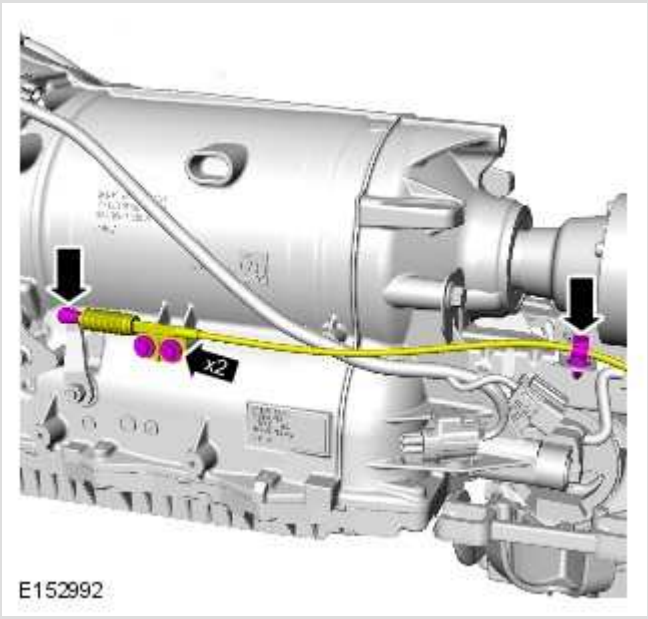
CAUTION:

Remove the cable tie.

cardiagn.com

19. **CAUTION:**

If necessary, install new clip.

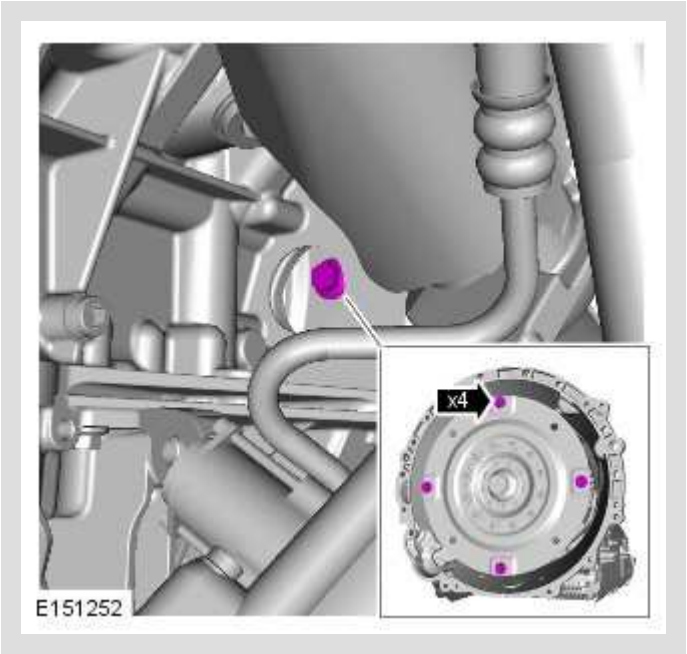


Torque: **11 Nm**

20. **CAUTIONS:**

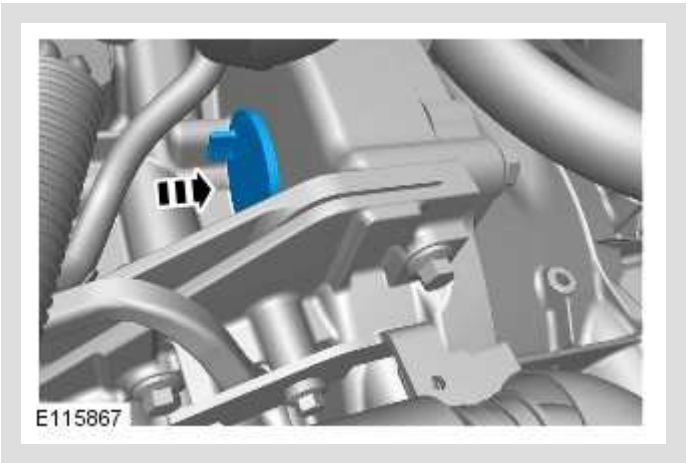
- Only rotate the crankshaft clockwise.
- Make sure that new bolts are installed.

cardiagn.com



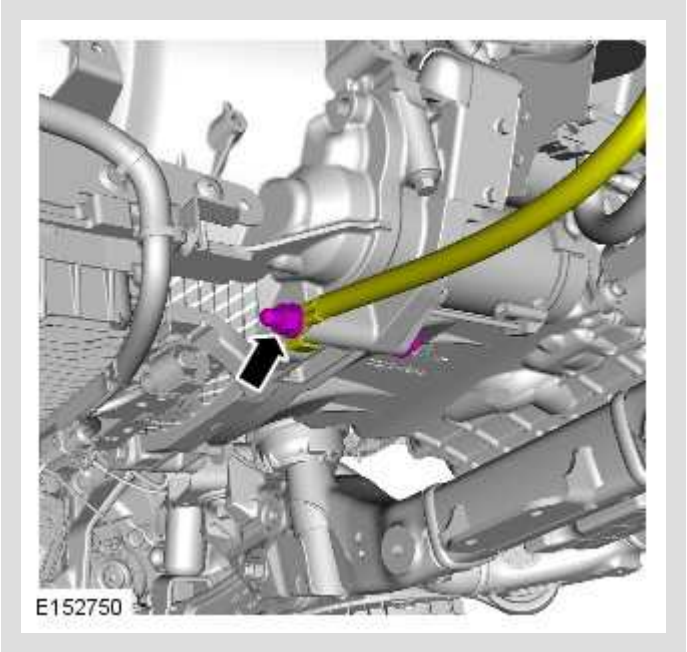
Torque: **63 Nm**

21.



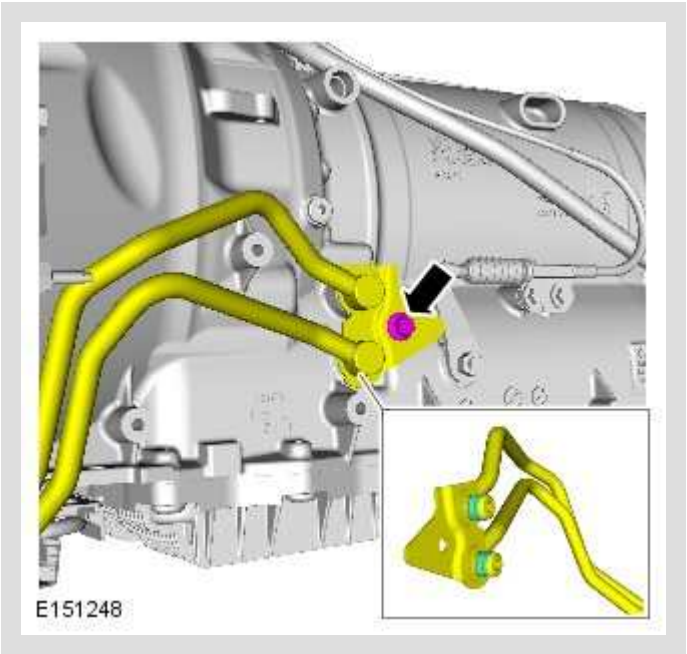
22.

cardiagn.com



Torque: **48 Nm**

23.



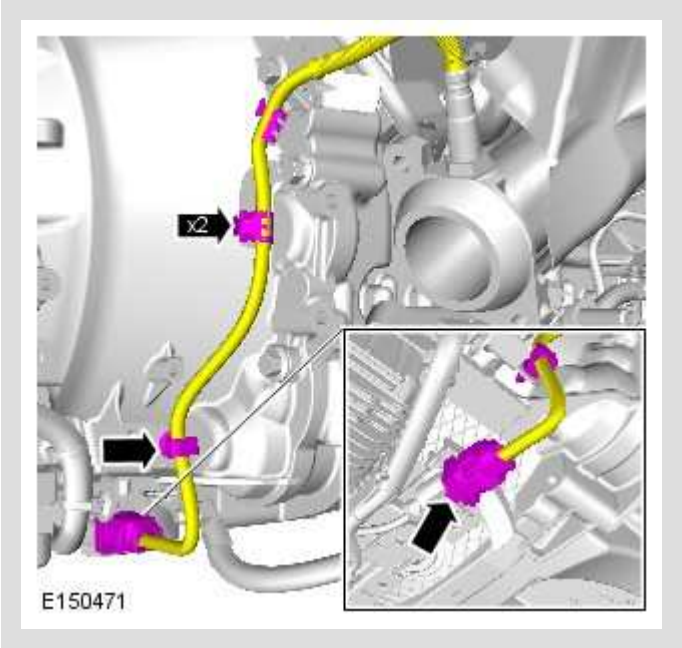
Torque: **22 Nm**

24.

CAUTION:

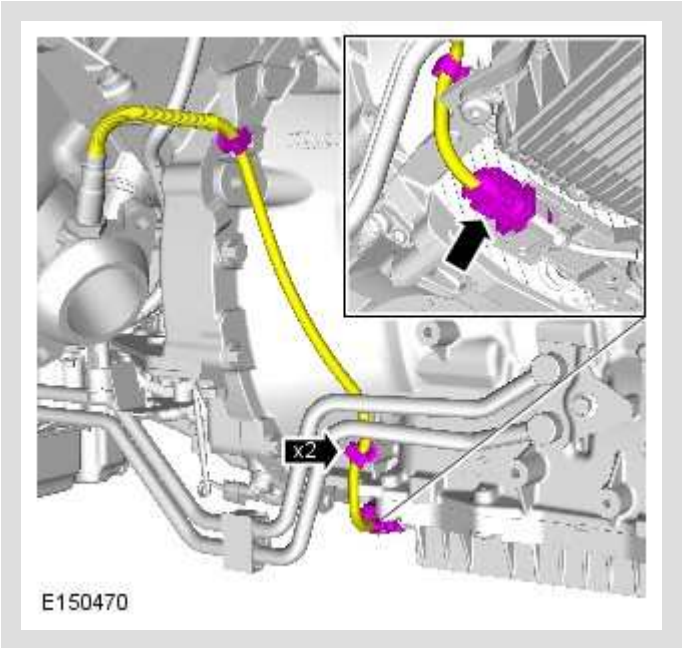
If necessary, install new clip.

cardiagn.com



25. **CAUTION:**

If necessary, install new clips.

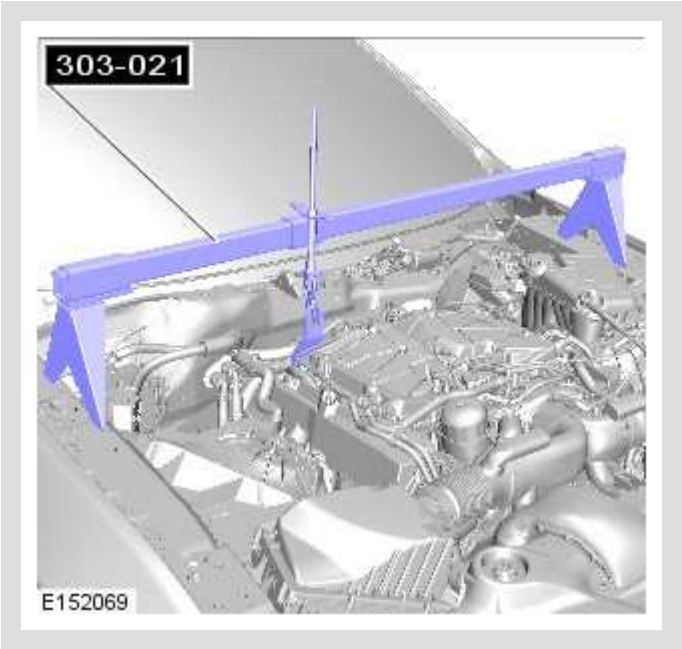


26. Refer to: Catalytic Converter LH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

cardiagn.com

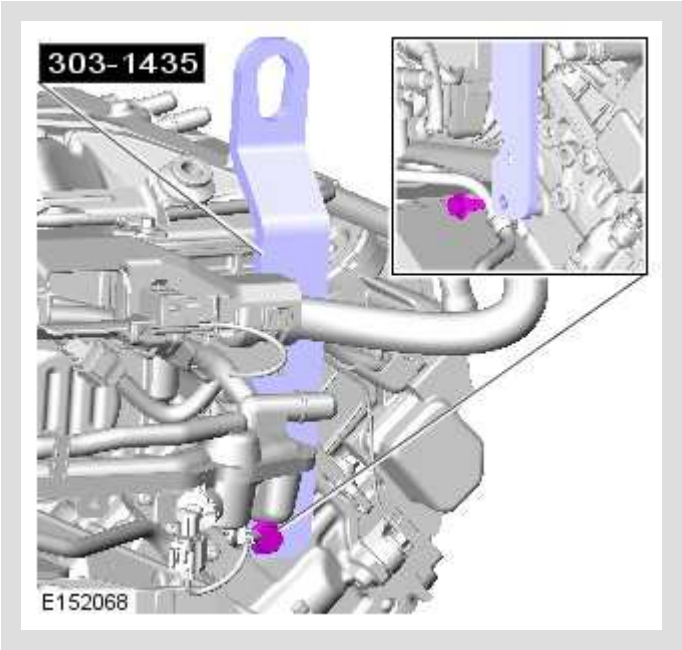
Refer to: Catalytic Converter RH (309-00B Exhaust System - V8 S/C 5.0L Petrol, Removal and Installation).

27.



Special Tool(s): 303-021

28.



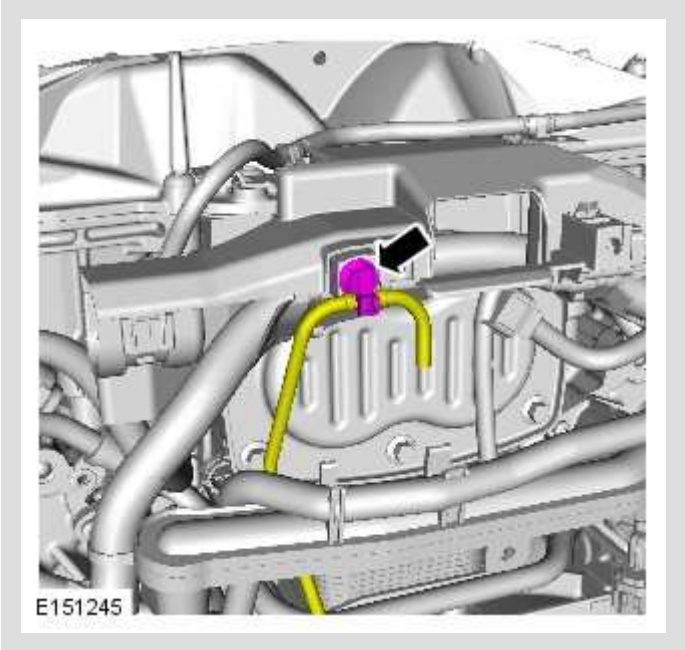
Special Tool(s): 303-1435

29.

cardiagn.com

Torque: **48 Nm**

30.



31. Refer to: Cowl Panel (501-02 Front End Body Panels, Removal and Installation).

32. Refer to: Engine Cover (501-05 Interior Trim and Ornamentation, Removal and Installation).

33.

cardiagn.com

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

34. Refer to: Transmission Fluid Level Check (307-01B Automatic Transmission/Transaxle - V8 S/C 5.0L Petrol, General Procedures).

2015.0 F-TYPE (X152), 303-03

ENGINE COOLING - V8 S/C 5.0L PETROL

COOLING SYSTEM DRAINING, FILLING AND BLEEDING (G1580405)

GENERAL PROCEDURES

26.10.01	COOLANT - DRAIN AND REFILL	ALL DERIVATIVES	1	USED WITHINS

DRAINING

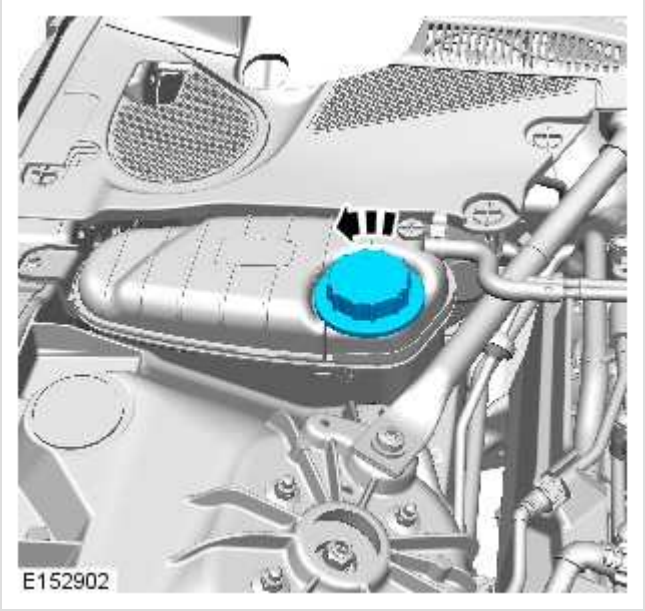
NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

1. **WARNINGS:**

cardiagn.com

- Release the cooling system pressure by slowly turning the coolant expansion tank cap a quarter of a turn. Cover the expansion tank cap with a thick cloth to prevent the possibility of scalding. Failure to follow this instruction may result in personal injury.
- Be prepared to collect escaping fluid.
- Since injury such as scalding could be caused by escaping steam or coolant, make sure the vehicle cooling system is cool prior to carrying out this procedure.



2. **WARNING:**

   Make sure to support the vehicle with axle stands.

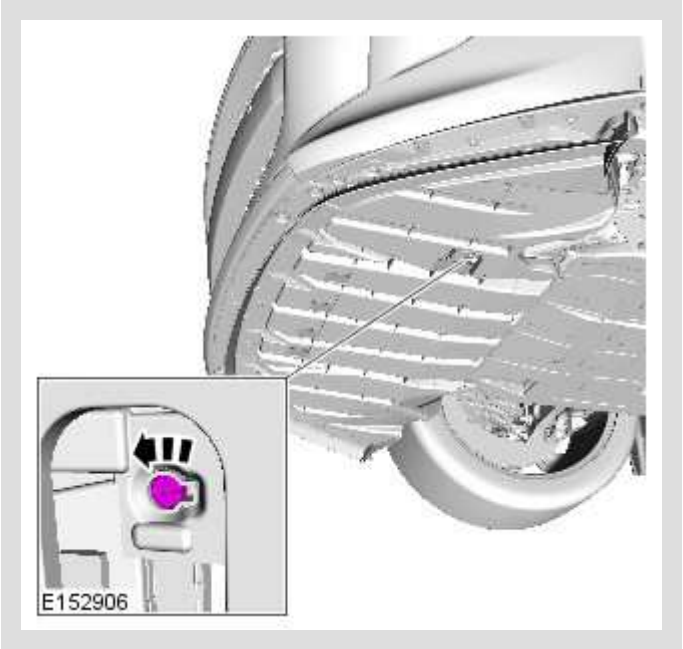
   Raise and support the vehicle.

3. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

4. **CAUTION:**

cardiagn.com

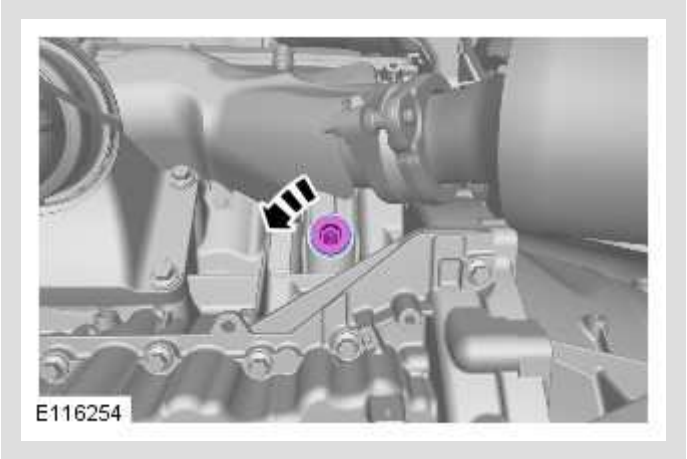
Be prepared to collect escaping fluids.



5.

CAUTION:

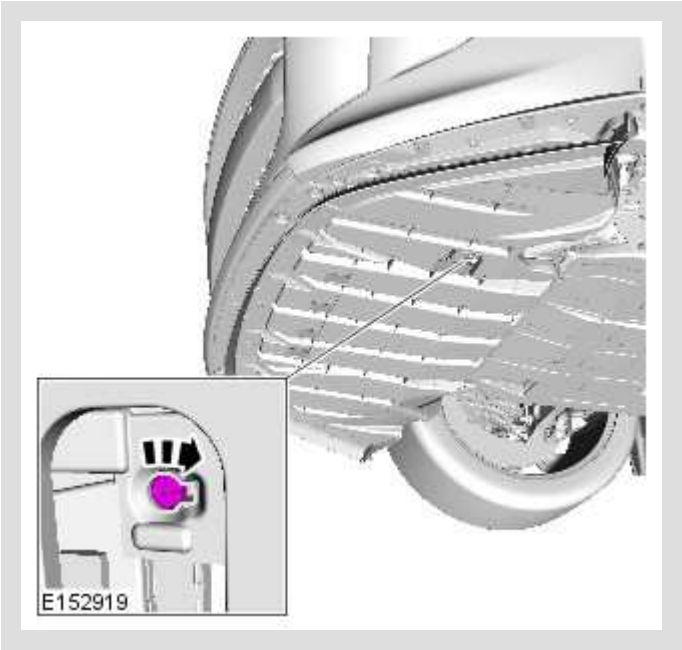
Be prepared to collect escaping fluids.



FILLING

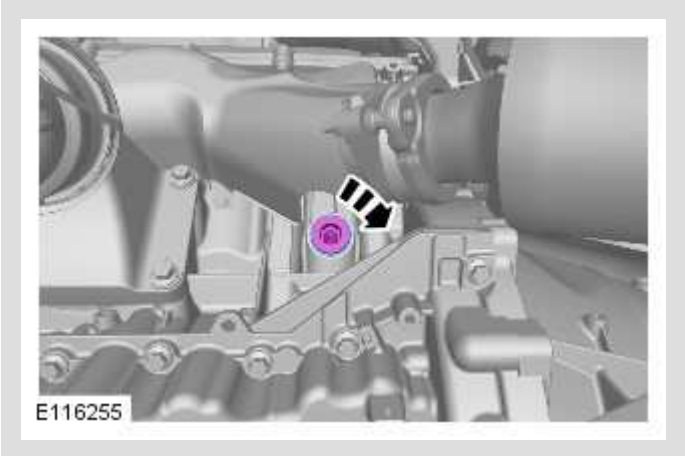
1.

cardiagn.com



Torque: **1.5 Nm**

2.



Torque: **50 Nm**

3. Lower the vehicle.

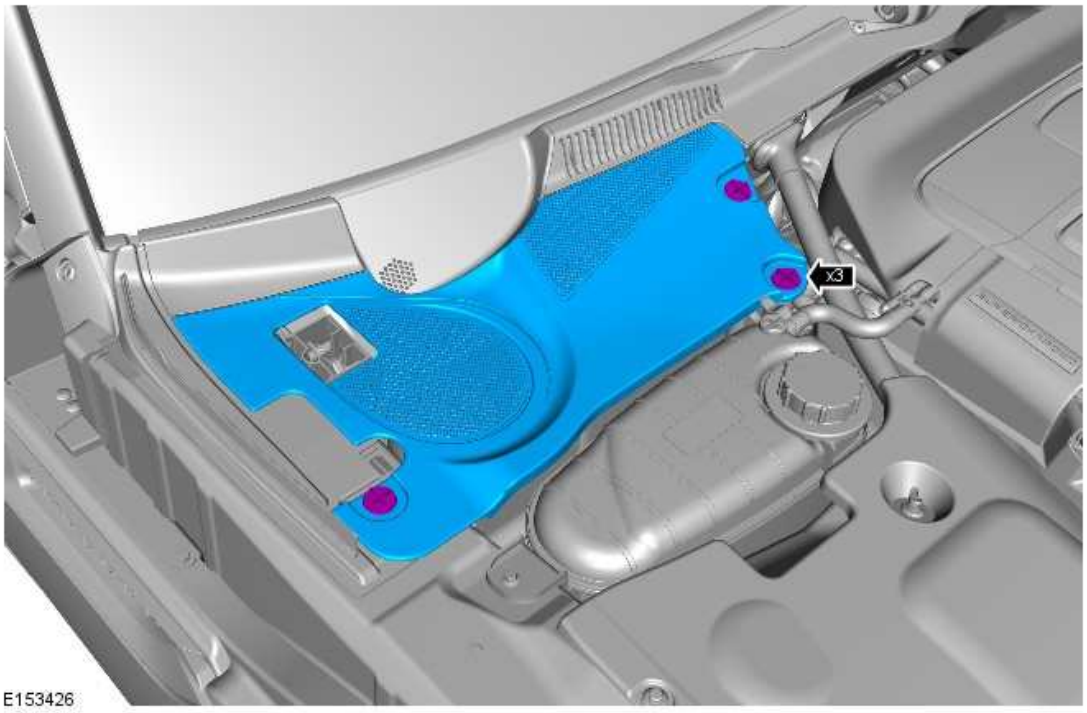
4. Carry out the previous five steps three times, filling the cooling system with clean water at the first two drains. At the third refill, use a suitable measuring tool to make sure that the cooling system maintains a 50% mix.

5.

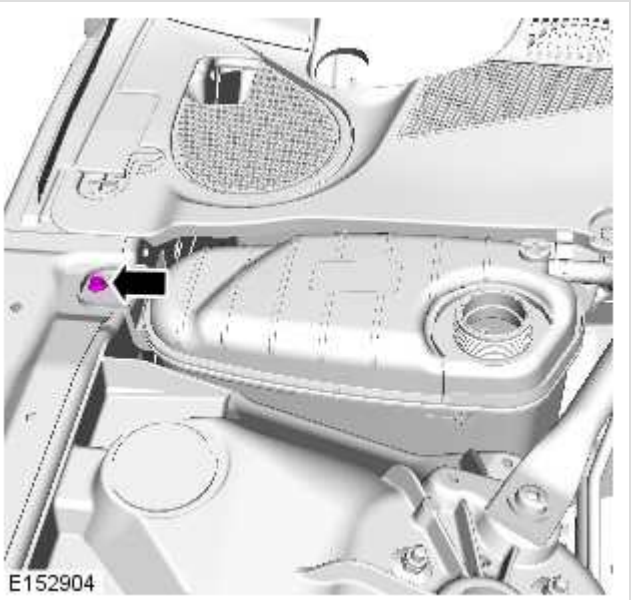
cardiagn.com

Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

6.



7.



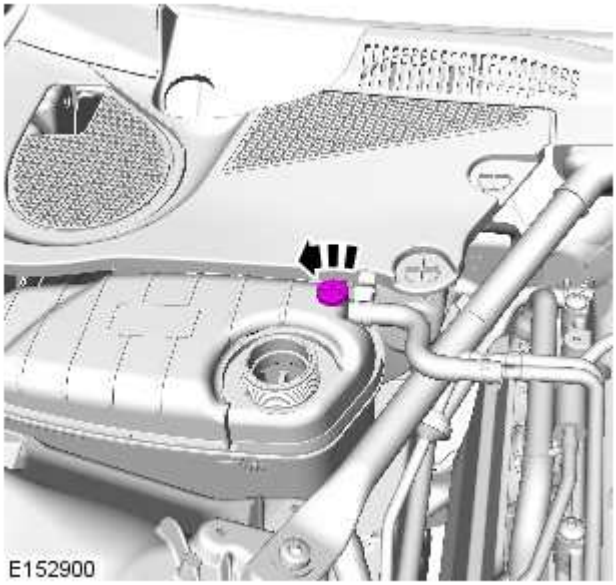
8.

cardiagn.com

Raise the coolant expansion tank 50mm from its original position.

9.

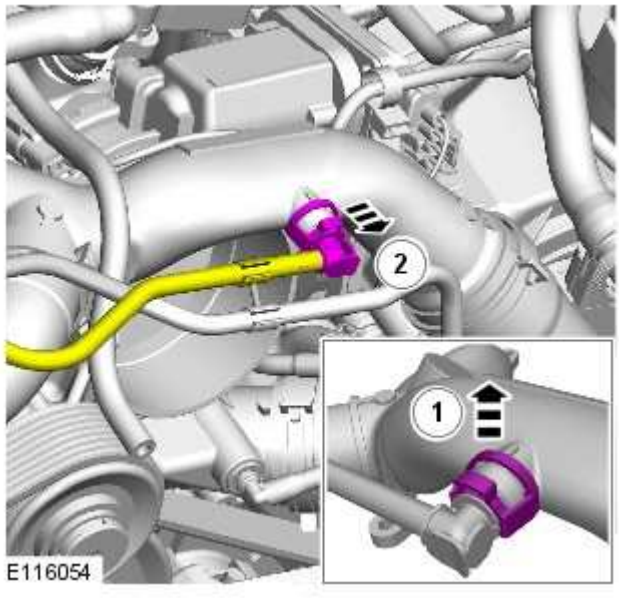
cardiagn.com



10.

CAUTION:

Make sure that the clip from the connector remains with the connector.



11.

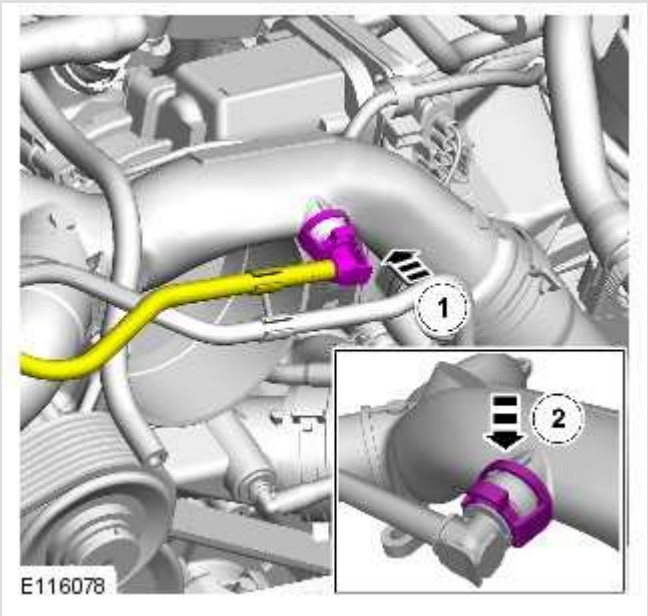
CAUTION:

Be prepared to collect escaping fluids.

cardiagn.com

Fill the coolant expansion tank to the rim and continue until coolant is visable from the outlet.

12.



Once coolant is visible from the outlet, connect the pipe.

13.

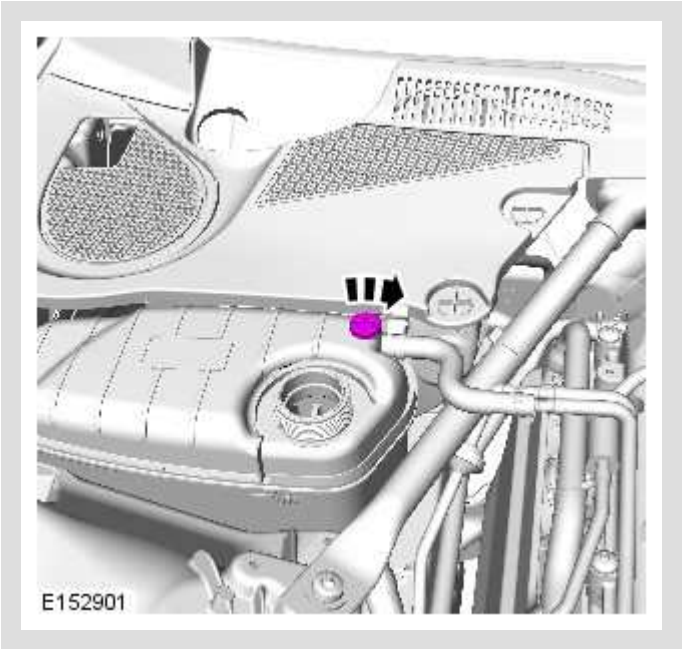
NOTE:

This step may take approximately 10 minutes as the coolant level will drop slowly.

Continue to fill the coolant expansion tank to the rim until the coolant level stops dropping.

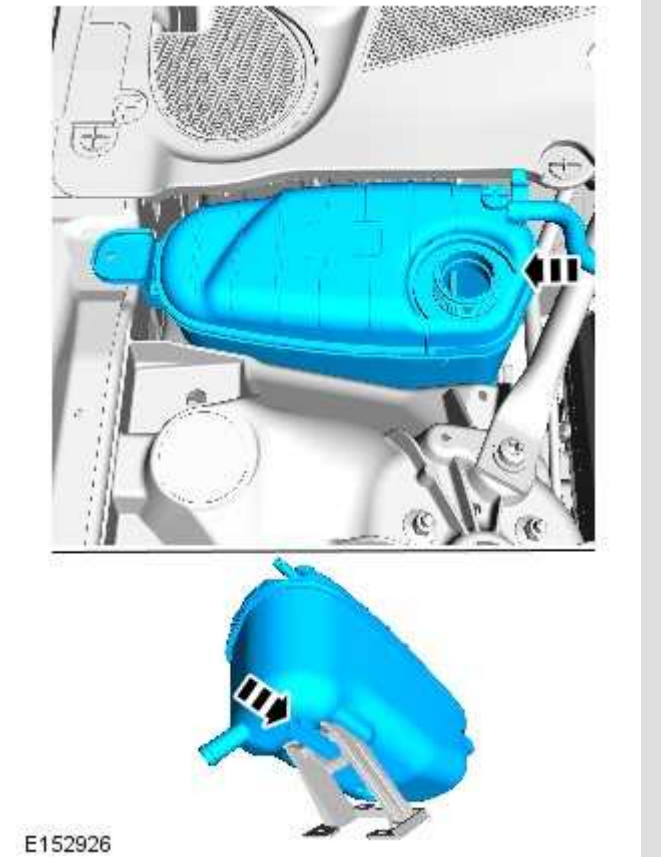
14.

cardiagn.com



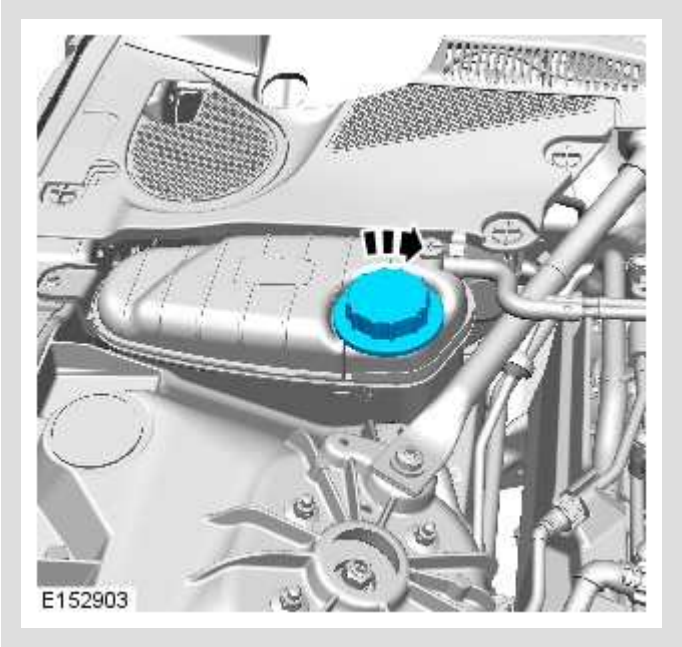
15.

cardiagn.com

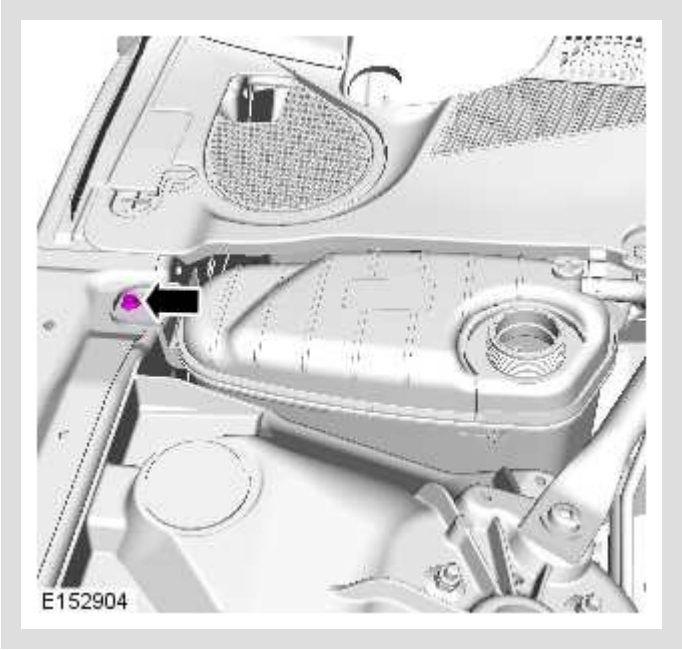


16.

cardiagn.com



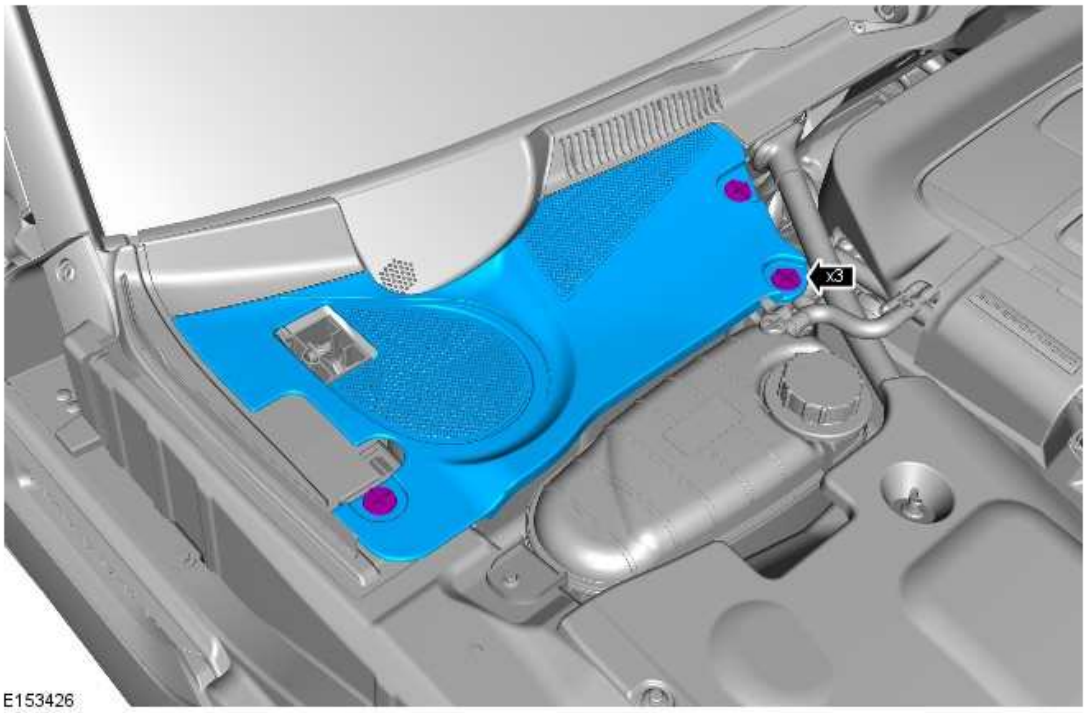
17.



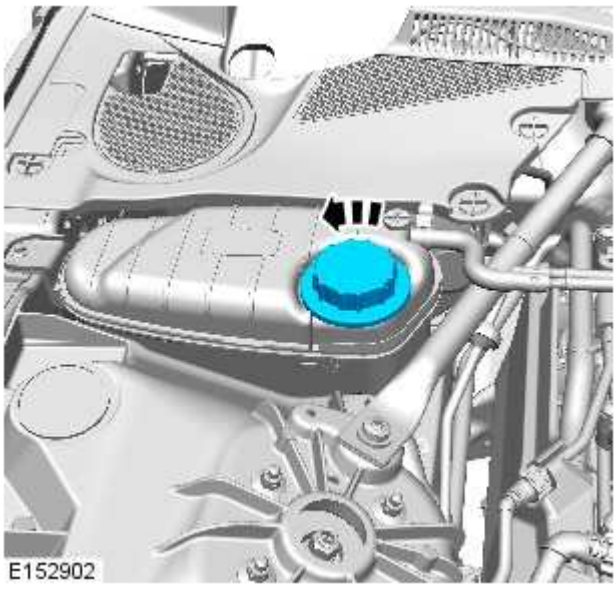
Torque: **9 Nm**

18.

cardiagn.com



19.



20.

⚠ WARNING:

Be prepared to collect escaping fluid.

cardiagn.com

Check and top-up the coolant if required.

21. Set the heater controls to maximum.

22. Start the engine.

23. Continue to top-up with coolant with the engine at idle.

24. Increase the engine speed to 2000 rpm for 2 minutes.

25.

Continue to top-up with coolant with engine idling until hot air is emitted from face vents.

When hot air is emitted from the vents, switch the heater off. Go to Step 25.

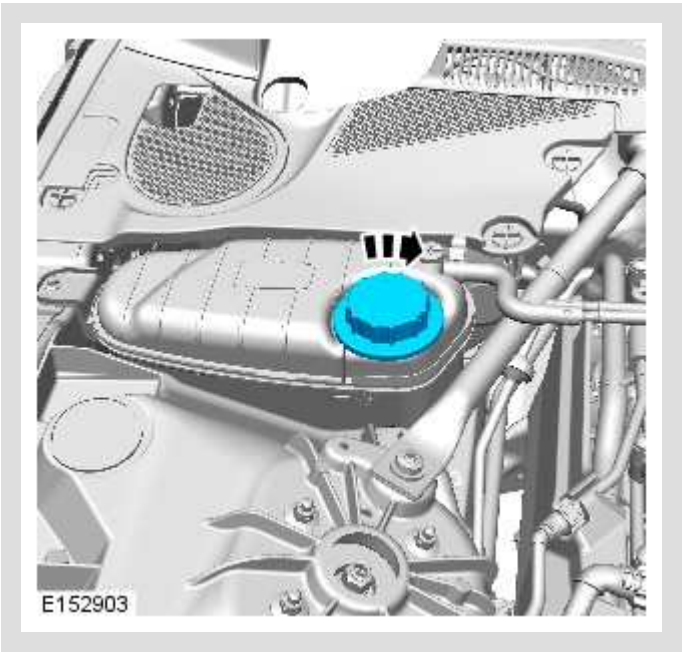
26. If no hot air is emitted, turn the engine off for 10 seconds and the start the engine and return to Step 22.

27.

CAUTION:

Correct installation of the coolant expansion tank cap can be obtained by tightening the cap until 3 audible clicks are heard.

cardiagn.com



Install the coolant expansion tank cap while the engine is at idle.

28. Switch the heater off.

29. Raise the engine speed to 2000 rpm for eight minutes.

30. **CAUTION:**

Switch off the engine and allow the coolant temperature to go cold.

cardiagn.com

Switch the engine off.

31. Visually check the engine and cooling system for signs of coolant leakage.

32. **WARNING:**

When releasing the cooling system pressure, cover the coolant expansion tank cap with a thick cloth.

CAUTIONS:

- Since injury such as scalding could be caused by escaping steam or coolant, make sure the vehicle cooling system is cool prior to carrying out this procedure.
- Make sure the coolant level remains above the "COLD FILL RANGE" lower level mark.

NOTE:

When the cooling system is warm, the coolant will be approximately 10mm above the upper level mark on the expansion tank with the cap removed.

Check and top-up the coolant if required.

cardiagn.com

AIR CLEANER OUTLET PIPE RH (G1580351)

REMOVAL AND INSTALLATION

19.10.36	AIR CLEANER OUTLET PIPE - RIGHT HAND - RENEW	ALL DERIVATIVES	0.6	USED WITHINS	

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

3.

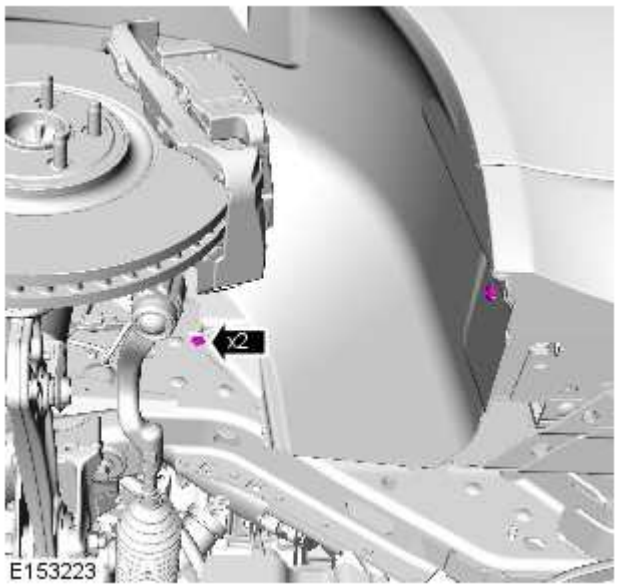
cardiagn.com

Refer to: Wheel and Tire (204-04 Wheels and Tires, Removal and Installation).

4.

NOTE:

LH illustration shown, RH is similar.

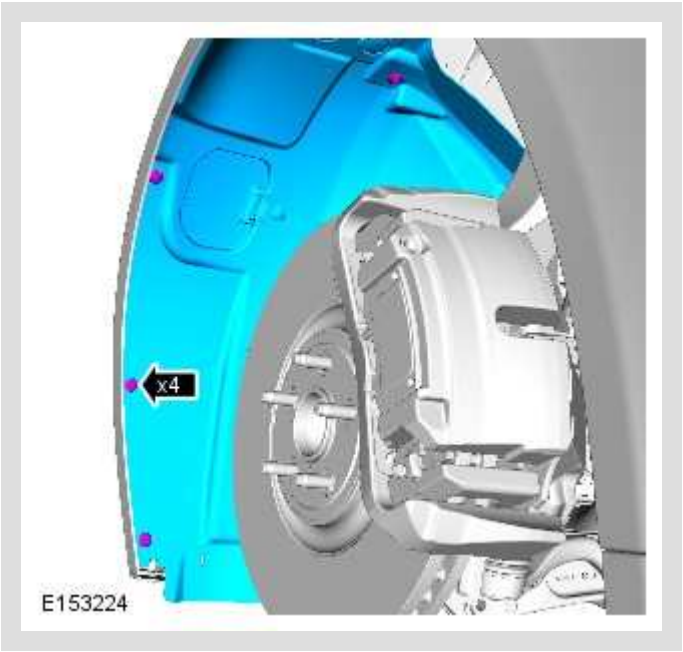


5.

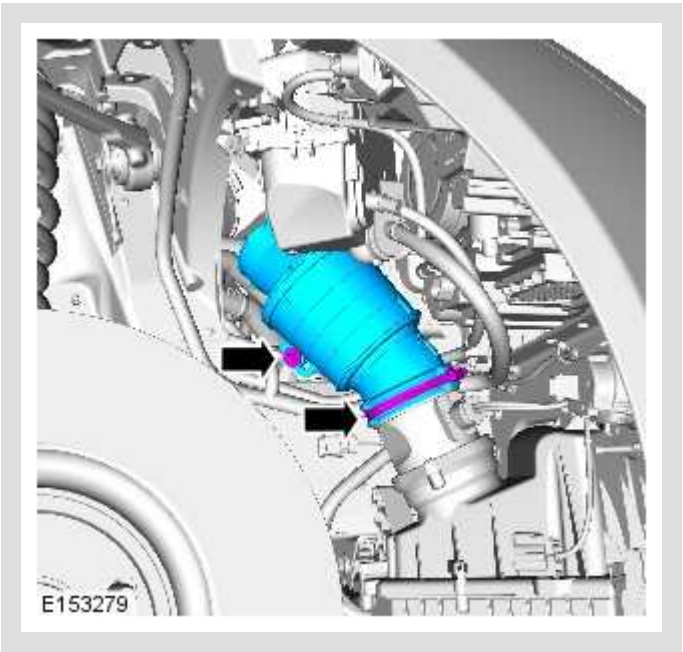
NOTE:

LH illustration shown, RH is similar.

cardiagn.com



6.



cardiagn.com

Torque:

M6 **9 Nm**

Clamp **3.3 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

2015.0 F-TYPE (X152), 211-00

STEERING SYSTEM - GENERAL INFORMATION

POWER STEERING SYSTEM FILLING (G1580162)

GENERAL PROCEDURES

57.15.02	LUBRICATION SYSTEM - DRAIN AND REFILL	ALL DERIVATIVES	0.8	USED WITHINS

DRAINING

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

1.

cardiagn.com

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

3. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

4. Using a syringe, remove the PAS fluid from the reservoir.

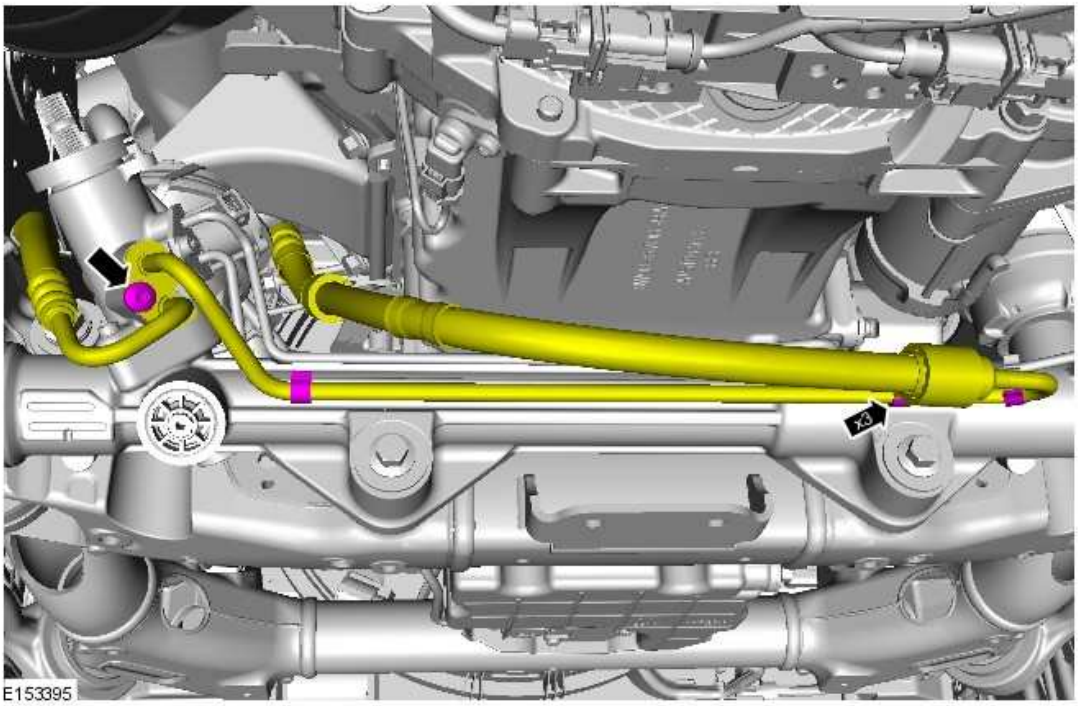
5. **CAUTIONS:**

   - Make sure that the area around the component is clean and free of foreign material.
   - Be prepared to collect escaping fluids.
   - Discard the o-ring seals.

NOTE:

cardiagn.com

LH illustration shown, RH is similar.



FILLING

1.

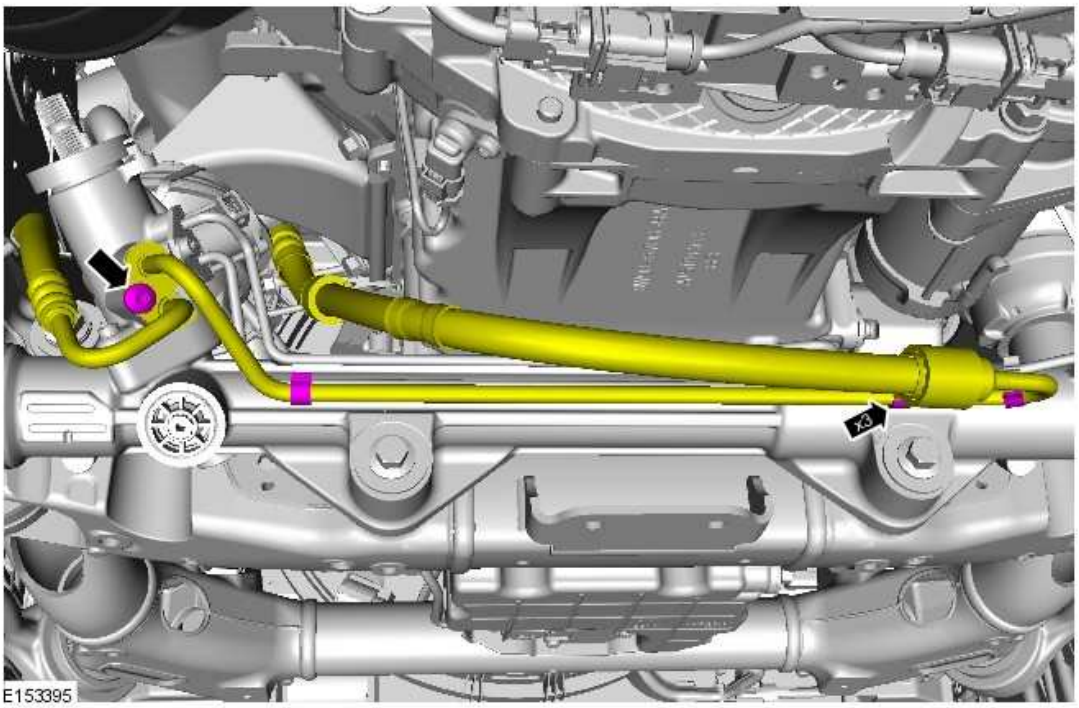
CAUTION:

Install new o-ring seals.

NOTES:

- Make sure that the component is clean, free of foreign material and lubricant.
- LH illustration shown, RH is similar.

cardiagn.com



Torque: **15 Nm**

2.

CAUTION:

Fluid must always be present in the reservoir during bleeding.

cardiagn.com

Fill the power steering reservoir.

3. Install the vacuum hand pump to the power steering fluid reservoir.

4.

NOTE:

Apply the maximum vacuum possible on the reservoir for 1 minute.

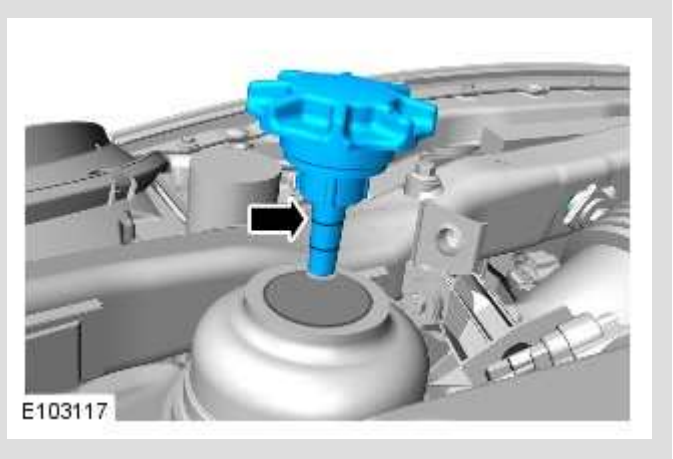
Apply a vacuum to the power steering fluid reservoir.

5. Remove the vacuum hand pump from the power steering fluid reservoir.

6.

CAUTION:

Fluid must always be present in the reservoir during bleeding.



Fill the power steering reservoir.

7.

Run the engine for 30 seconds.

cardiagn.com

Turn the steering fully lock-to-lock, stop the engine.

8. Install the vacuum hand pump to the power steering fluid reservoir.

9. **NOTE:**

Apply the maximum vacuum possible on the reservoir for 1 minute.

Apply a vacuum to the power steering fluid reservoir.

10. Remove the vacuum hand pump from the power steering fluid reservoir.

11. **CAUTION:**

Fluid must always be present in the reservoir during bleeding.

Fill the power steering reservoir.

12. Run the engine for 30 seconds.

cardiagn.com

Turn the steering fully lock-to-lock, stop the engine.

13. Install the vacuum hand pump to the power steering fluid reservoir.

14. **NOTE:**

Apply the maximum vacuum possible on the reservoir for 1 minute.

Apply a vacuum to the power steering fluid reservoir.

15. Remove the vacuum hand pump from the power steering fluid reservoir.

16. **CAUTION:**

Fluid must always be present in the reservoir during bleeding.

Fill the power steering reservoir.

17. Run the engine for 30 seconds.

cardiagn.com

Turn the steering fully lock-to-lock, stop the engine.

18. Install the power steering fluid reservoir cap.

19. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

20. Lower the vehicle.

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

TIMING COVER (G1780495)

REMOVAL AND INSTALLATION

SPECIAL TOOL(S)

E107676	**303-1433** Lower Timing Cover Alignment tool

REMOVAL

cardiagn.com

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

All vehicles

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

Vehicles with 3.0L SC engine

1. Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Accessory Drive Belt Tensioner (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Thermostat Housing (303-03A Engine Cooling - V6 S /C 3.0L Petrol, Removal and Installation).
   Refer to: Electric Thermostat (303-03A Engine Cooling - V6 S /C 3.0L Petrol, Removal and Installation).

2. **NOTE:**

   Both components must be removed.

cardiagn.com

Refer to: Valve Cover LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Valve Cover RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

Vehicles with 5.0L SC engine

1. Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Accessory Drive Belt Tensioner (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Thermostat Housing (303-03A Engine Cooling - V6 S /C 3.0L Petrol, Removal and Installation).

2. **NOTE:**

Both components must be removed.

Refer to: Valve Cover LH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).
Refer to: Valve Cover RH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

All vehicles

1. Refer to: Crankshaft Pulley (303-01A, Removal and Installation).
Refer to: Crankshaft Pulley (303-01B, Removal and Installation).

2. Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

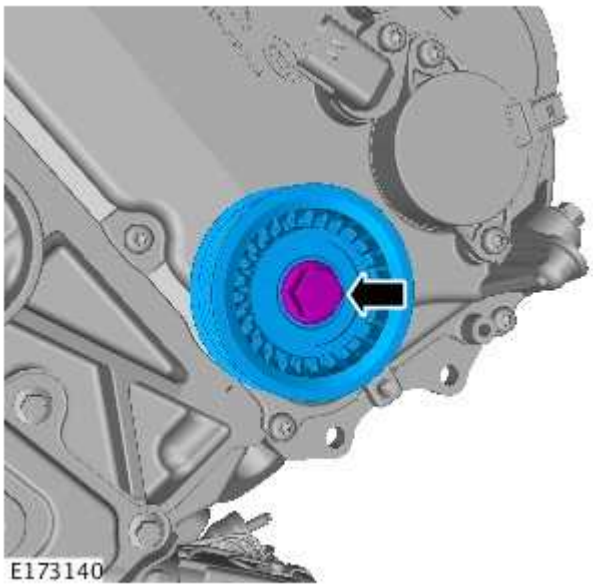
Vehicles with hydraulic power steering

cardiagn.com

1.

Vehicles with electric power steering

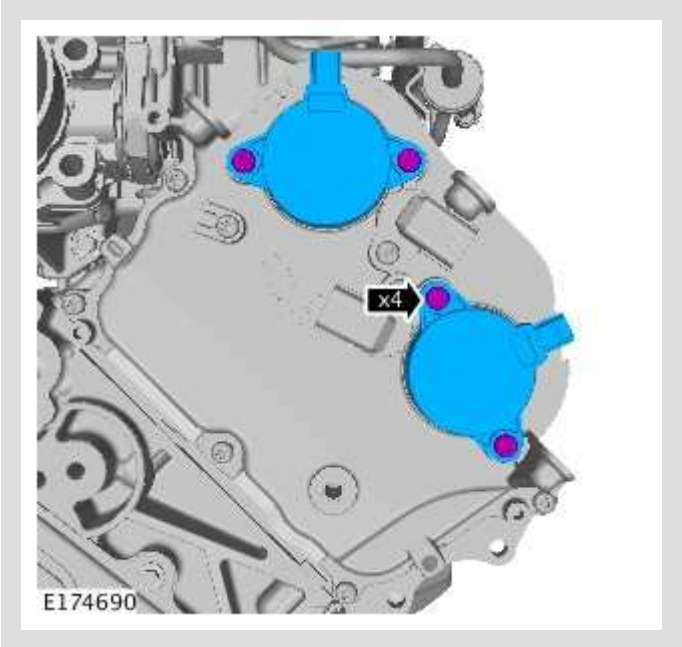
1.



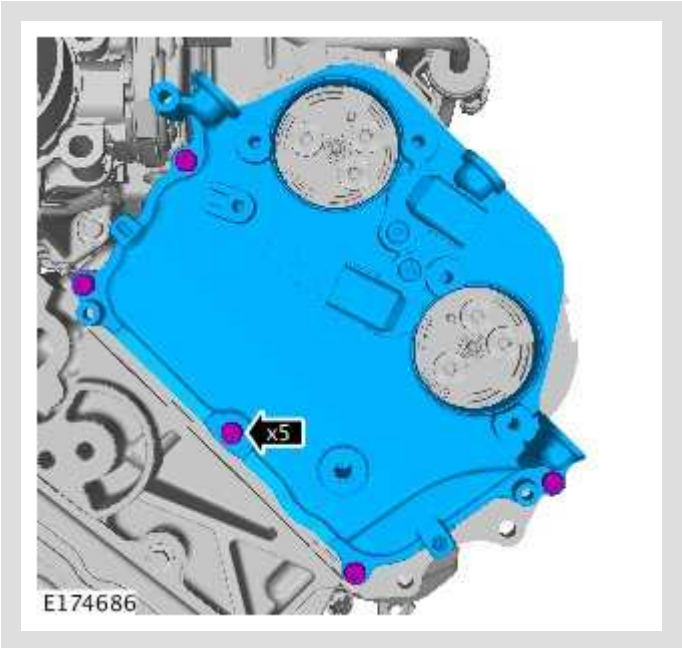
All vehicles

1.

cardiagn.com

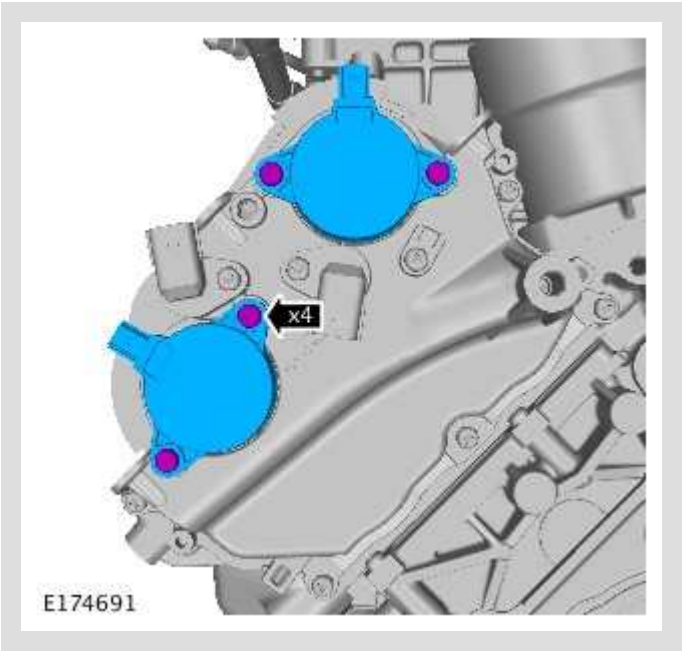


2.

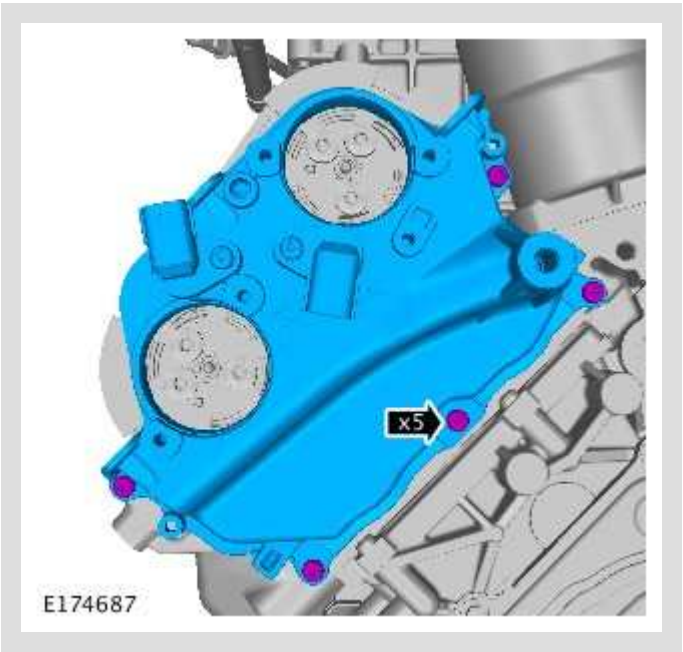


3.

cardiagn.com



4.



5. Refer to: Crankshaft Pulley (303-01 Engine - V8 S/C 5.0L Petrol, Removal and Installation).

6.

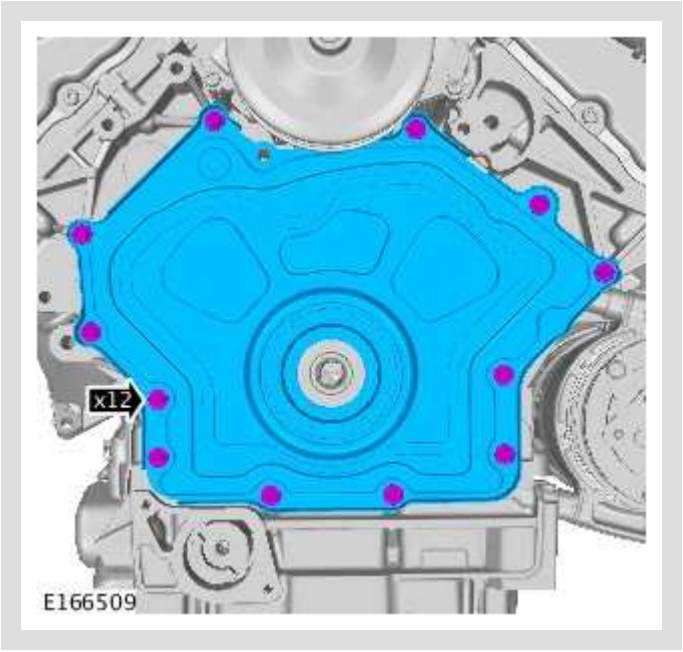
cardiagn.com

Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

7.

CAUTION:

Discard the component.



INSTALLATION

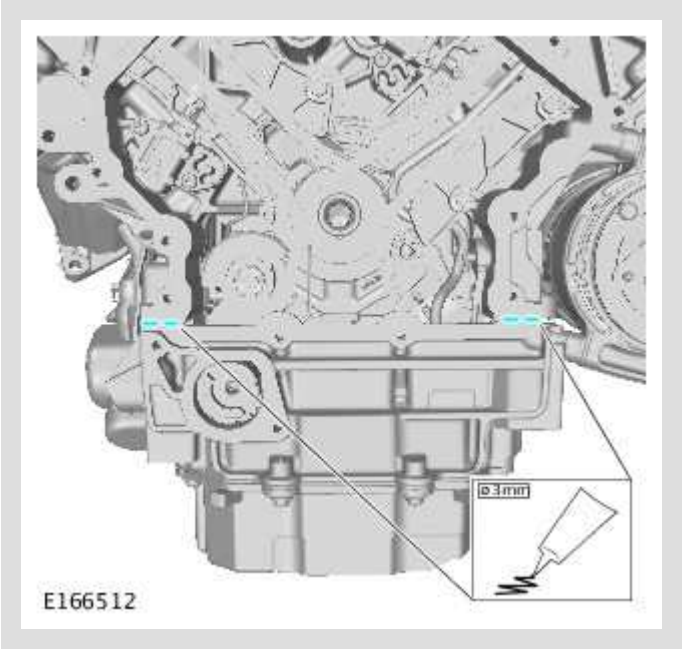
All vehicles

1.

CAUTIONS:

- Use only a plastic scraper when removing the sealing material.
- Make sure that the mating faces are clean and free of foreign material.
- Make sure that the Land Rover approved cleaning fluid (Loctite 7063) is used to clean the mating faces.

cardiagn.com



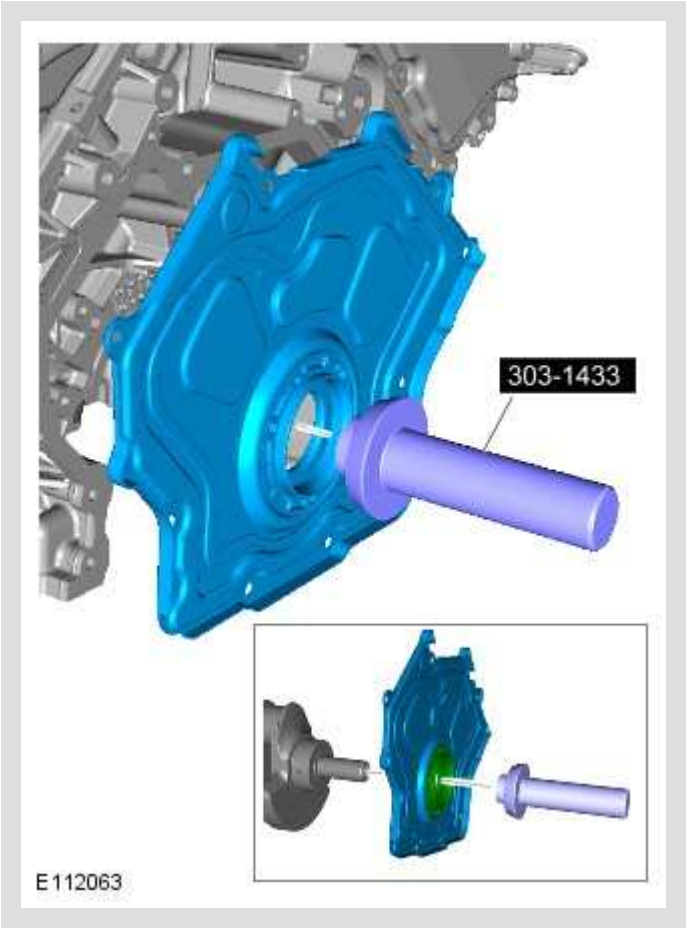
Apply RTV sealant (Loctite 5901G) to the areas shown.

2.

CAUTION:

Make sure that the mating faces are clean and free of foreign material.

cardiagn.com



Install the bolts, but do not tighten fully at this stage.

Special Tool(s): 303-1433

cardiagn.com

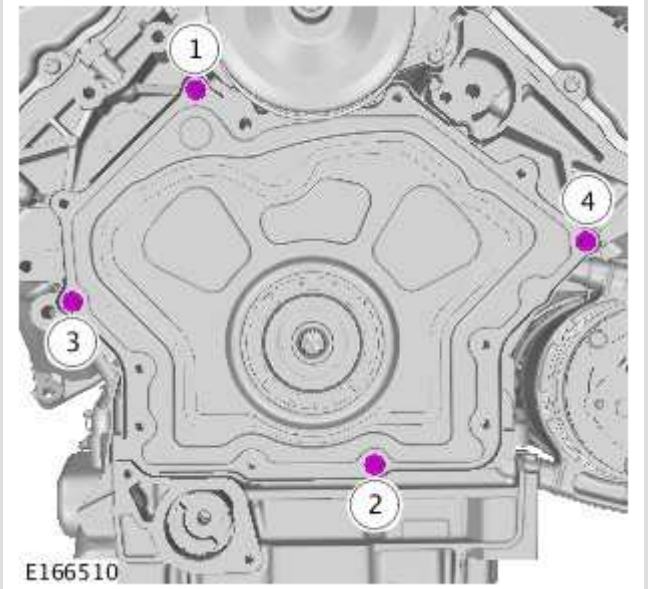
3.

CAUTION:

Make sure that a new component is installed.

NOTES:

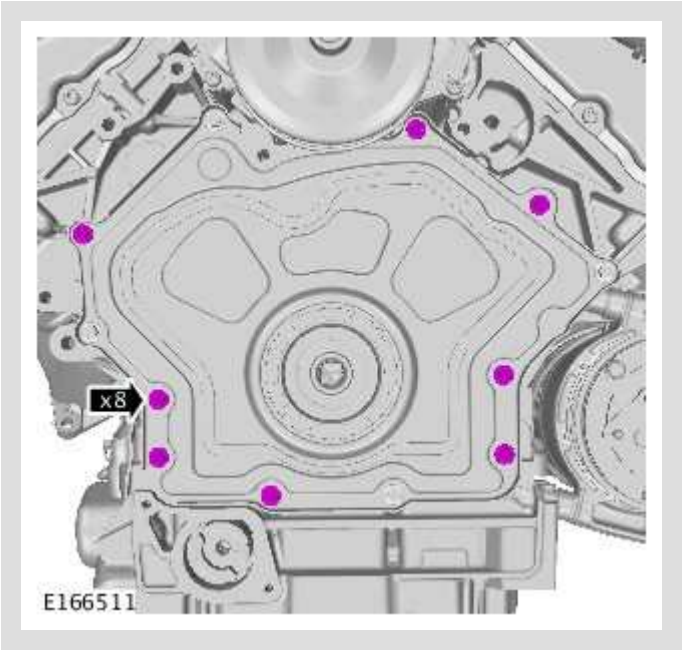
- Tighten the bolts in the indicated sequence.
- Special tools shown removed for clarity.



Torque: **12 Nm**

4.

cardiagn.com



Torque: **12 Nm**

5. Remove the special tools.

6. Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

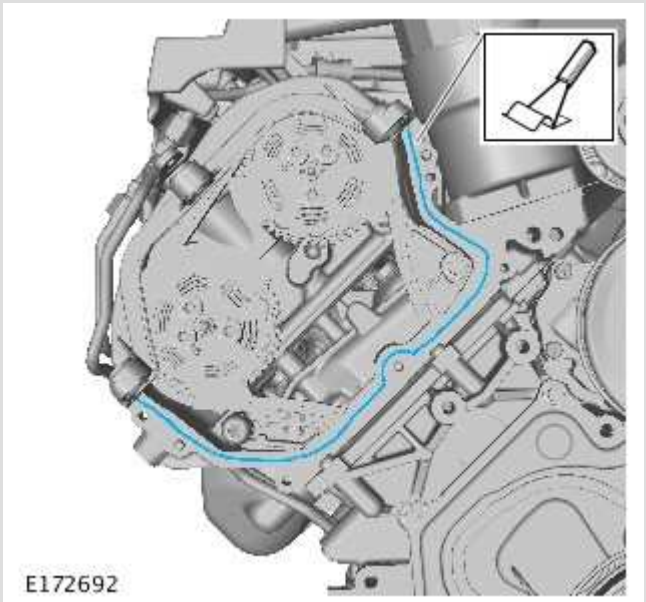
7. Refer to: Crankshaft Pulley (303-01A, Removal and Installation).
Refer to: Crankshaft Pulley (303-01B, Removal and Installation).

8.

cardiagn.com

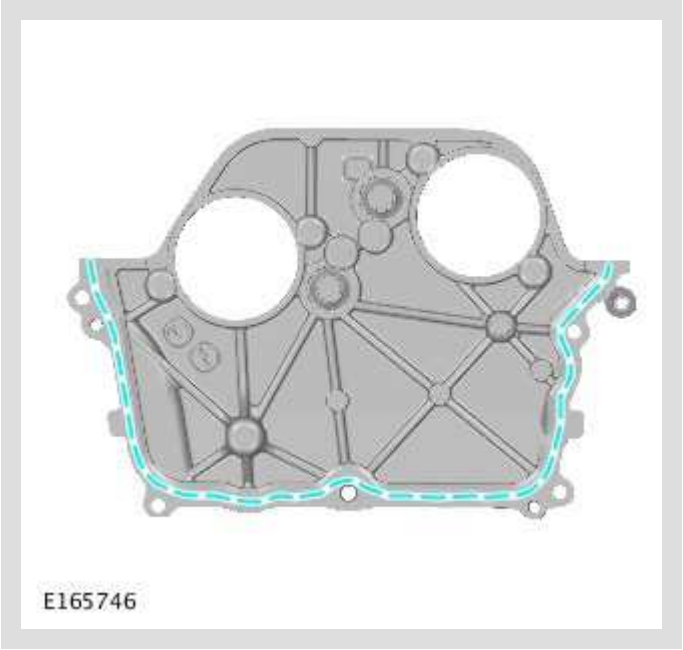
CAUTIONS:

- Use only a plastic scraper when removing the sealing material.
- Make sure that the mating faces are clean and free of foreign material.
- Make sure that the Land Rover approved cleaning fluid (Loctite 7063) is used to clean the mating faces.



9.

cardiagn.com



Apply RTV sealant (Loctite 5901G) to the areas shown, and tighten the bolts within 7 minutes.

10.

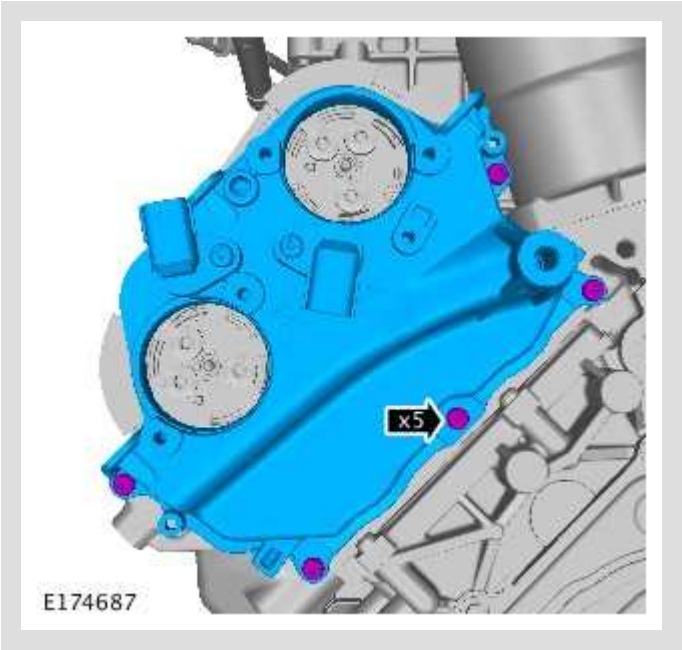
CAUTION:

Install all the bolts finger tight before final tightening.

NOTE:

Tighten the bolts in the indicated sequence.

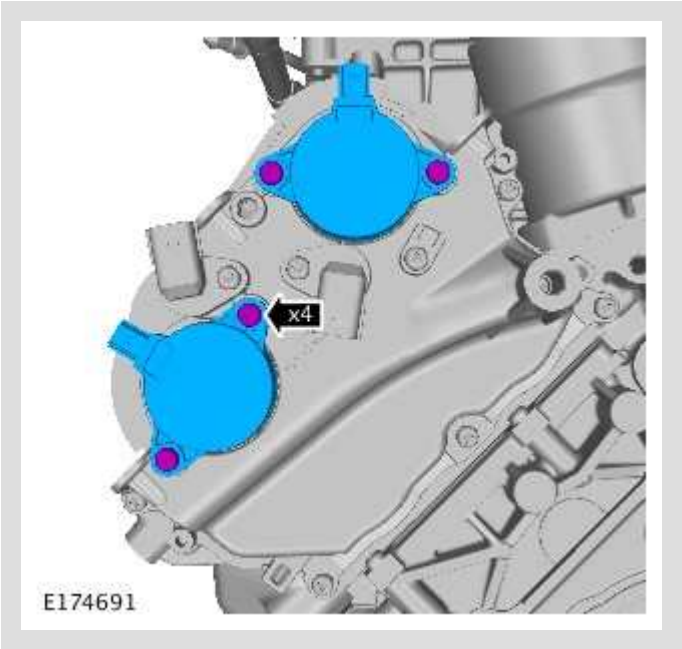
cardiagn.com



Torque: **12 Nm**

11.

cardiagn.com



Torque: **12 Nm**

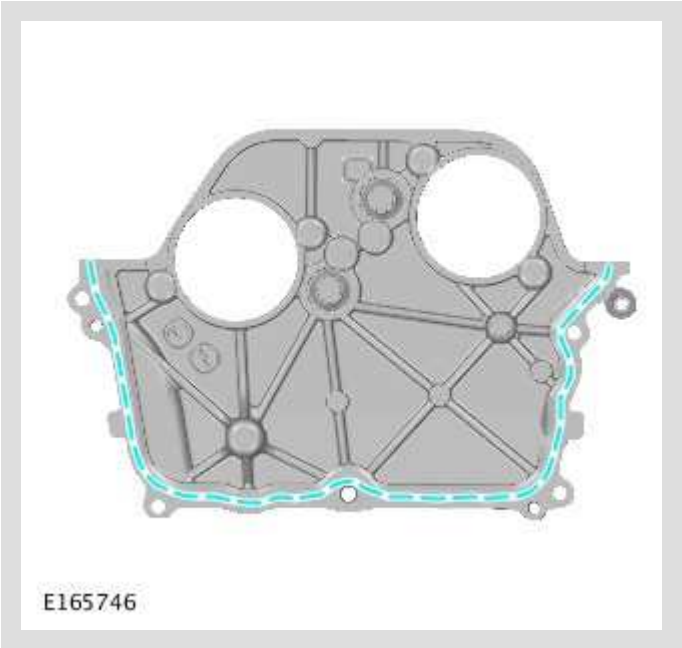
12.

CAUTIONS:

- Use only a plastic scraper when removing the sealing material.
- Make sure that the mating faces are clean and free of foreign material.
- Make sure that the Land Rover approved cleaning fluid (Loctite 7063) is used to clean the mating faces.

cardiagn.com

13.



Apply RTV sealant (Loctite 5901G) to the areas shown, and tighten the bolts within 7 minutes.

14.

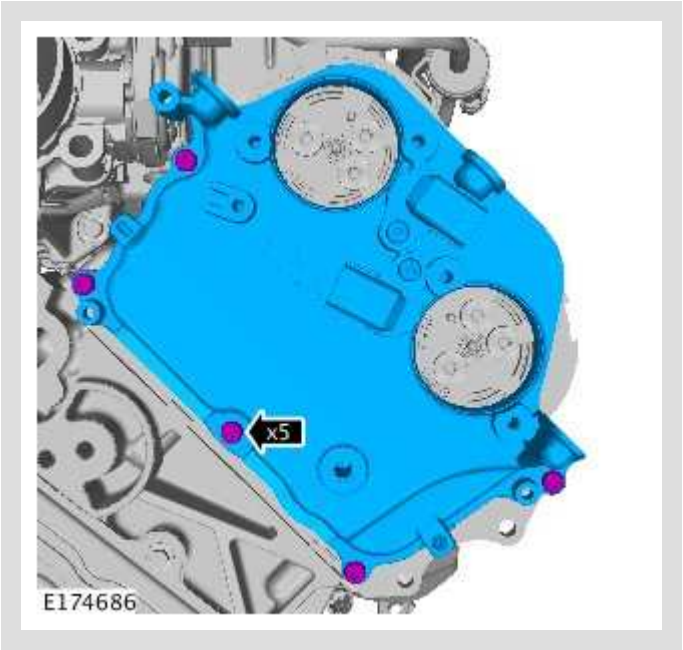
CAUTION:

Install all the bolts finger tight before final tightening.

cardiagn.com

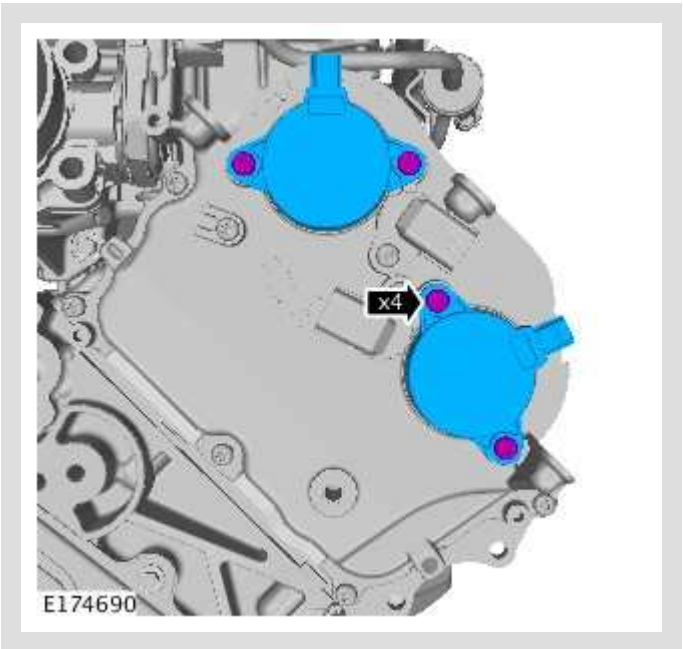
NOTE:

Tighten the bolts in the indicated sequence.



Torque: **12 Nm**

15.



Torque: **12 Nm**

Vehicles with electric power steering

1.

cardiagn.com

Torque: **48 Nm**

Vehicles with hydraulic power steering

1.

Torque: **25 Nm**

Vehicles with 5.0L SC engine

1.

cardiagn.com

Refer to: Valve Cover LH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).
Refer to: Valve Cover RH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

2. Refer to: Thermostat Housing (303-03A Engine Cooling - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Accessory Drive Belt Tensioner (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

Vehicles with 3.0L SC engine

1. Refer to: Valve Cover LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Valve Cover RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

2. Refer to: Electric Thermostat (303-03A Engine Cooling - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Thermostat Housing (303-03A Engine Cooling - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Accessory Drive Belt Tensioner (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

All vehicles

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

ENGINE - V8 S/C 5.0L PETROL

VALVE COVER RH (G1584153)

REMOVAL AND INSTALLATION

12.29.44	CAMSHAFT COVER - RIGHT HAND - RENEW	3000 CC, AJ V6 (AJ126)	6.5	USED WITHINS	

SPECIAL TOOL(S)

303-1446

Valve Cover Alignment Tool

REMOVAL

NOTES:

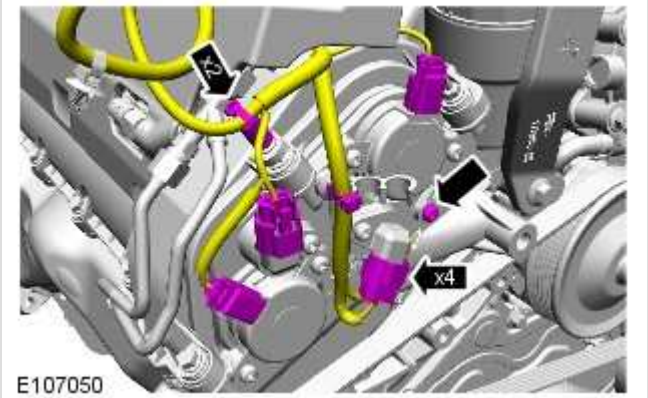
cardiagn.com

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Supercharger (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

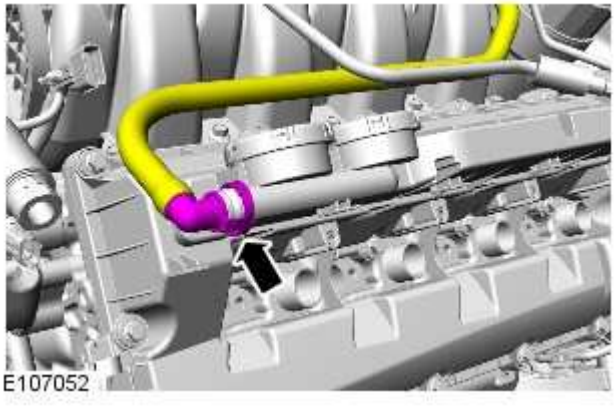
3. Refer to: Fuel Rail RH (303-04B Fuel Charging and Controls - V8 S/C 5.0L Petrol, Removal and Installation).

4. 

5. **NOTE:**

   Some variation in the illustrations may occur, but the essential information is always correct.

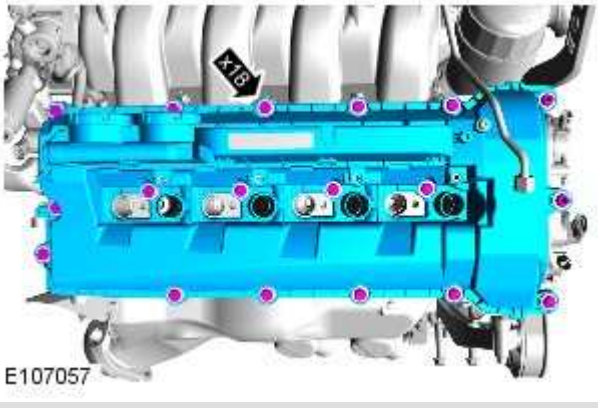
cardiagn.com



6.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.



INSTALLATION

1.

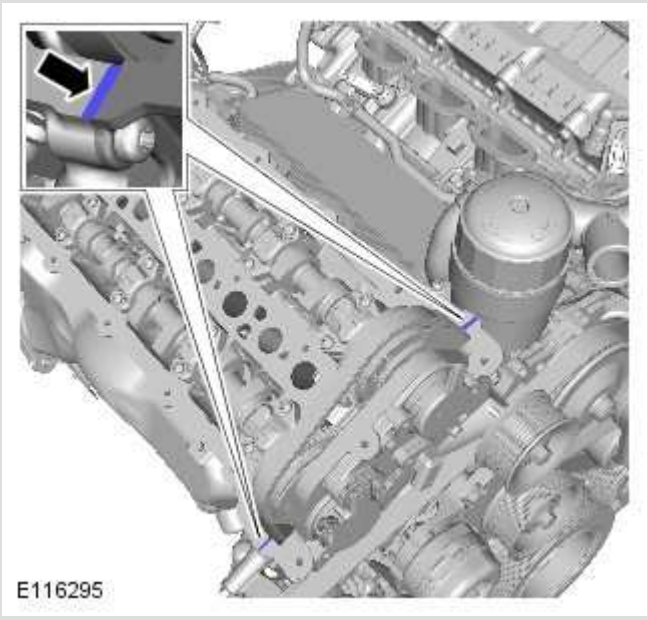
CAUTIONS:

cardiagn.com

- Use only a plastic scraper when removing the sealing material.
- Use lint free cloth.
- Make sure that the mating faces are clean and free of corrosion and foreign material.
- Installation of the valve cover and tightening must be carried out within 7 minutes of applying the sealant.

NOTE:

Apply two beads of silcone gasket sealant (Loctite 5901G or Loctite 5900) as shown on the illustration. The application of the sealant must be 1.5mm diameter 12mm long. Install the valve cover immediately after applying the sealant. The cover should be fitted directly to the head without smearing the sealant or the seals.



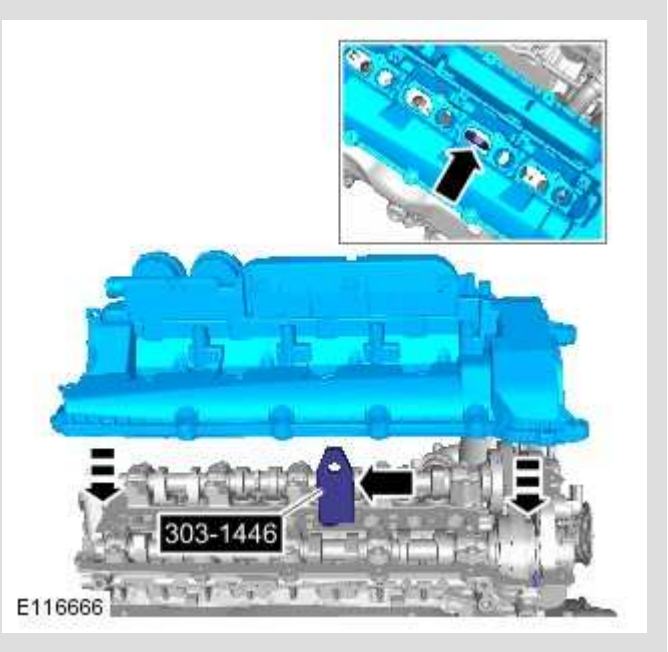
To install, reverse the removal procedure.

2.

NOTE:

cardiagn.com

Some variation in the illustrations may occur, but the essential information is always correct.

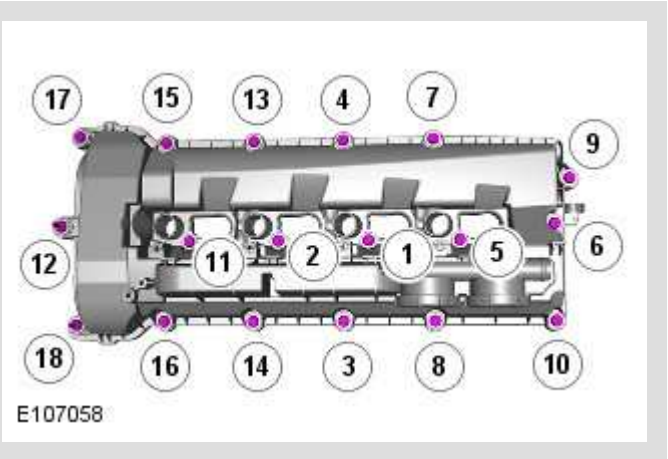


Special Tool(s): 303-1446

3.

NOTE:

Tighten the bolts in the indicated sequence.



Torque: **13 Nm**

cardiagn.com

ACCESSORY DRIVE - V6 S/C 3.0L PETROL

ACCESSORY DRIVE BELT TENSIONER (G1580334)

REMOVAL AND INSTALLATION

12.10.41	TENSIONER ASSEMBLY - FRONT END ACCESSORY DRIVE - RENEW	ALL DERIVATIVES	0.7	USED WITHINS	

REMOVAL

All vehicles

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Air Cleaner Outlet Intermediate Pipe LH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Air Cleaner Outlet Intermediate Pipe LH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

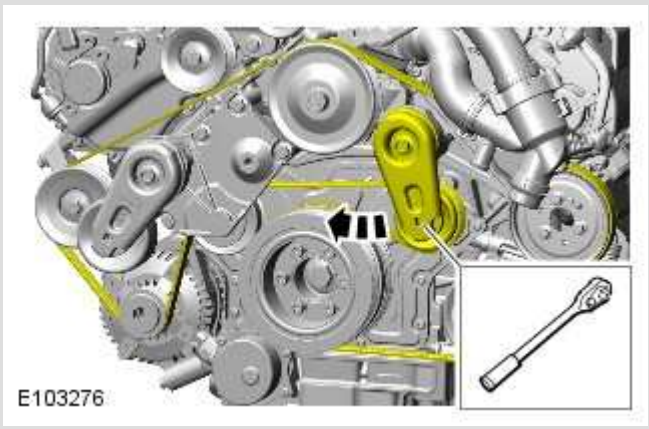
cardiagn.com

2. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

Vehicles with hydraulic power steering

1. **NOTE:**

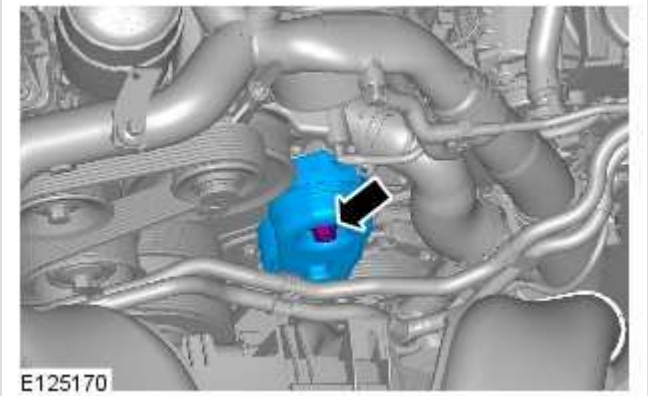
Note the fitted position of the accessory drive belt.



2. **NOTE:**

Install the bolt finger tight before final tightening.

cardiagn.com



Torque: **47 Nm**

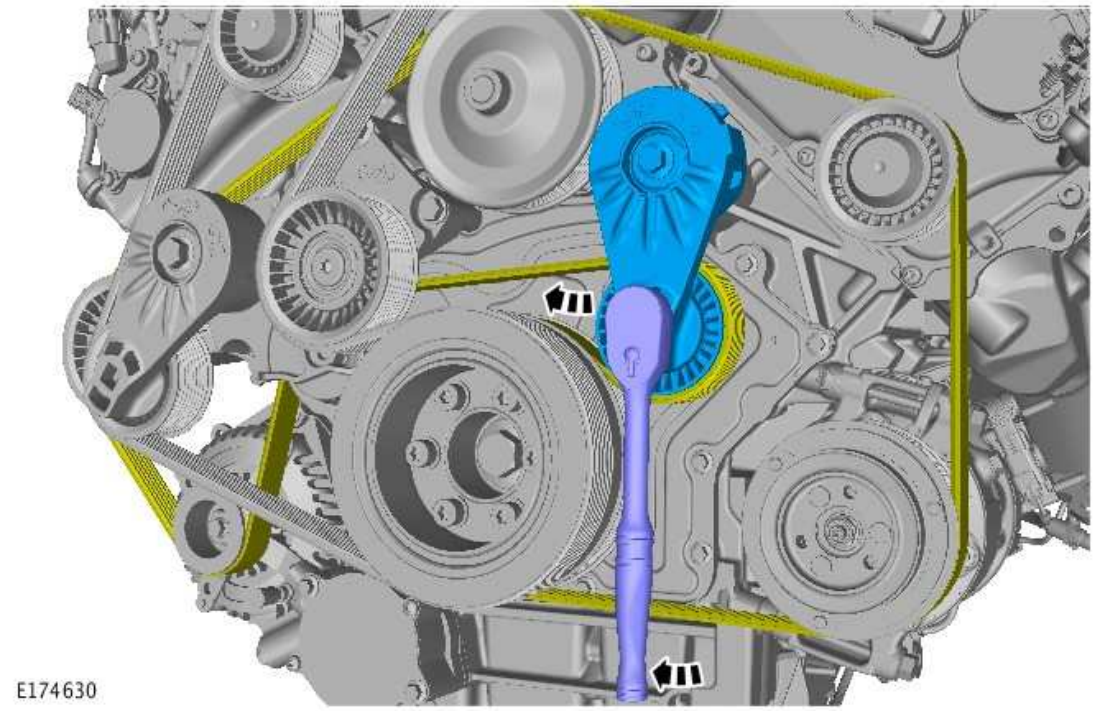
	Vehicles with electric power steering

1.

NOTE:

Note the fitted position of the accessory drive belt.

cardiagn.com

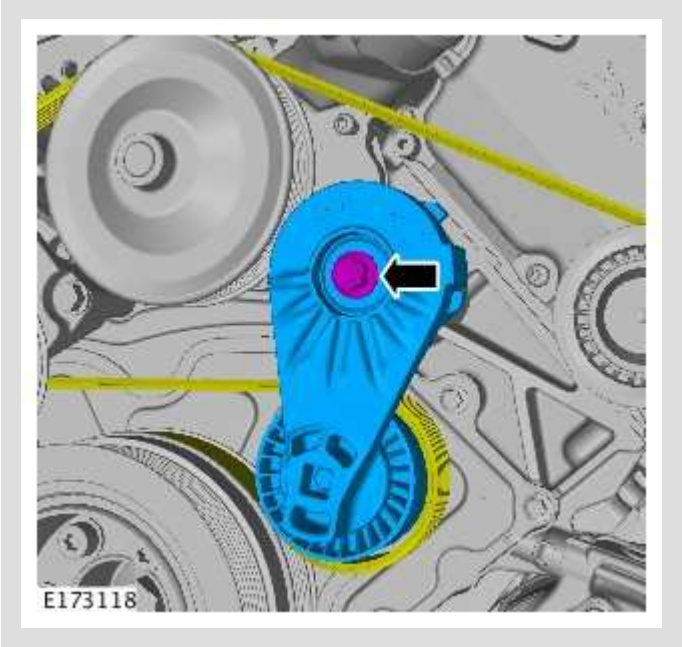


2.

NOTE:

Install the bolt finger tight before final tightening.

cardiagn.com



Torque: **47 Nm**

INSTALLATION

1.

CAUTION:

Make sure that the accessory drive belt is correctly located on each pulley.

To install, reverse the removal procedure.

cardiagn.com

ENGINE COOLING - V6 S/C 3.0L PETROL

THERMOSTAT HOUSING (G1580412)

REMOVAL AND INSTALLATION

26.45.21	THERMOSTAT HOUSING - ENGINE SET - RENEW	ALL DERIVATIVES	1.2	USED WITHINS

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

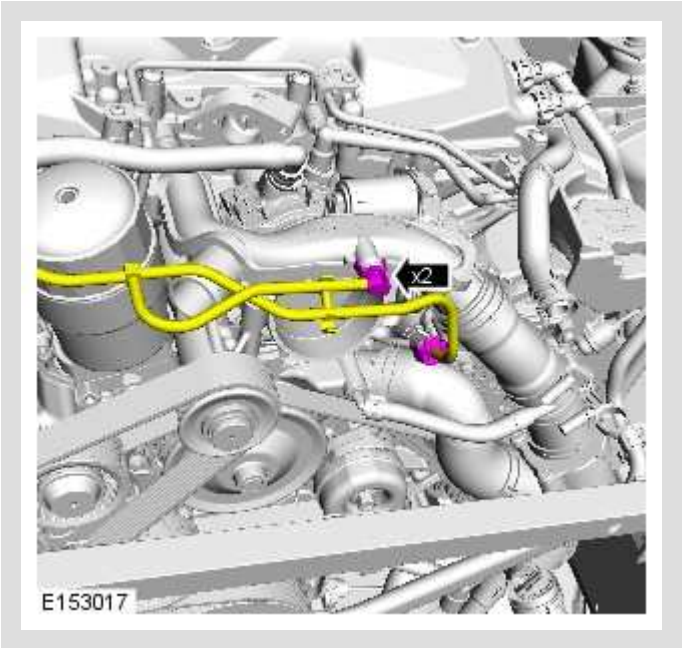
2. Refer to: Cooling System Partial Draining and Vacuum Filling (303-03A Engine Cooling - V6 S/C 3.0L Petrol, General Procedures).

3. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

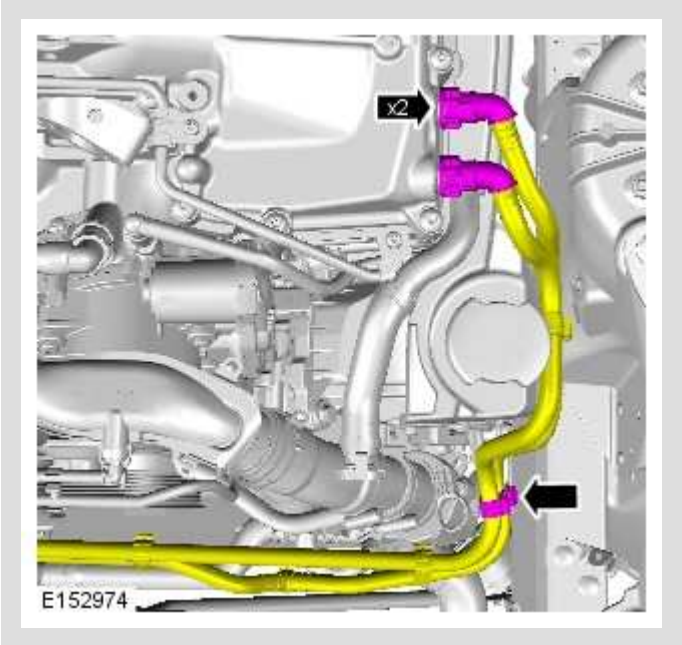
cardiagn.com

4. Refer to: Air Cleaner Outlet Pipe LH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

5.

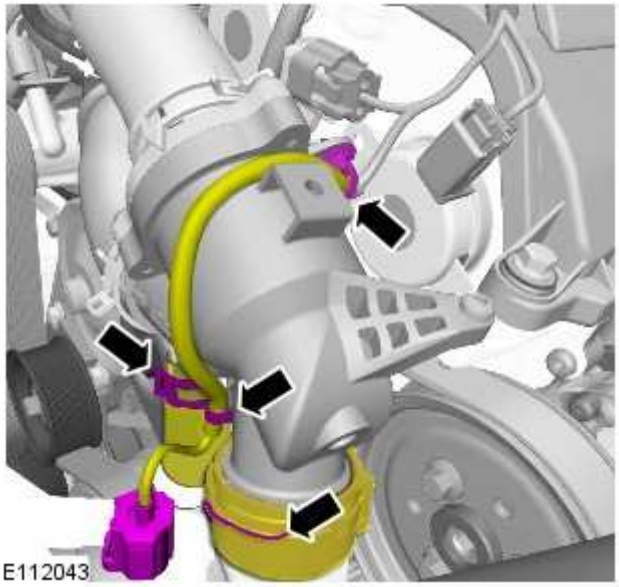


6.



7.

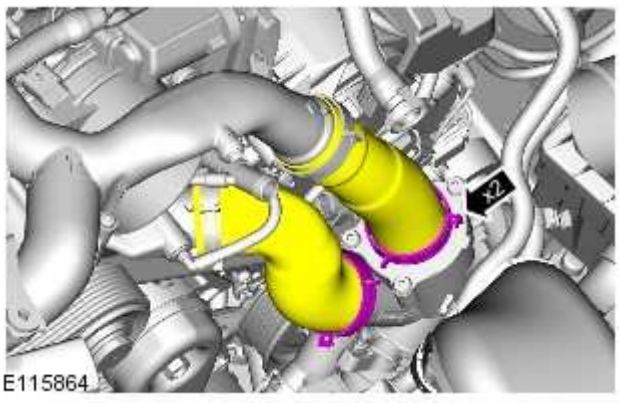
cardiagn.com



8.

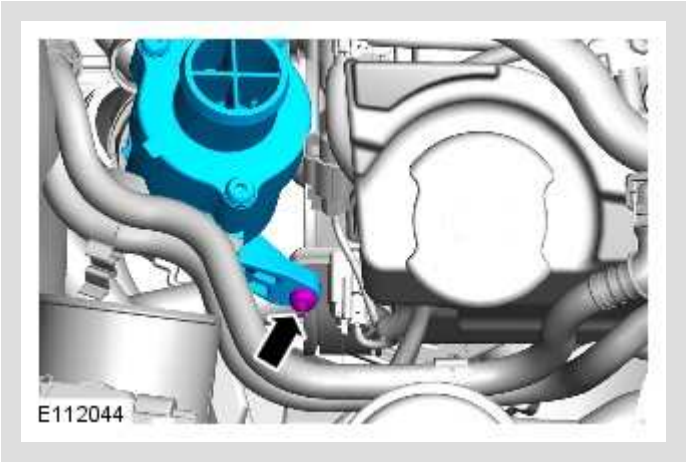
NOTE:

The retaining clips cannot be removed from the pipe.



9.

cardiagn.com



Torque: **10 Nm**

INSTALLATION

1. To install, reverse the removal procedure.

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

VALVE COVER RH (G1584121)

REMOVAL AND INSTALLATION

12.29.44	CAMSHAFT COVER - RIGHT HAND - RENEW	3000 CC, AJ V6 (AJ126)	6.5	USED WITHINS	

SPECIAL TOOL(S)

	303-1446 Valve Cover Alignment Tool

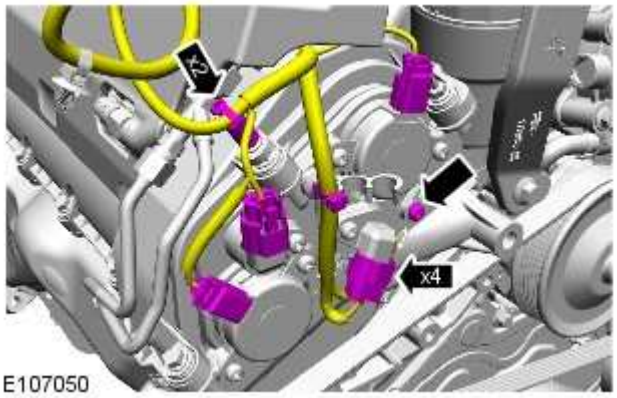
REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

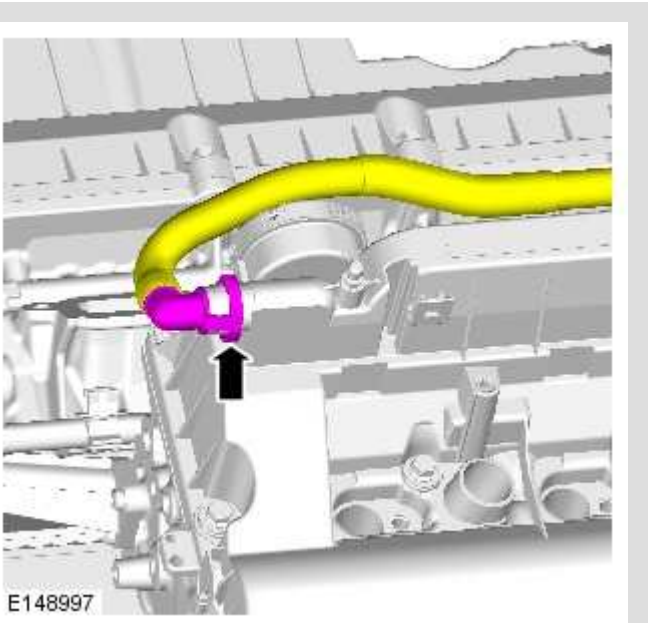
1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
2. Refer to: Supercharger (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
3. Refer to: Fuel Rail RH (303-04A Fuel Charging and Controls - V6 S/C 3.0L Petrol, Removal and Installation).
4.

cardiagn.com



Torque: **10 Nm**

5.



6.

cardiagn.com

E148969

INSTALLATION

1.

CAUTIONS:

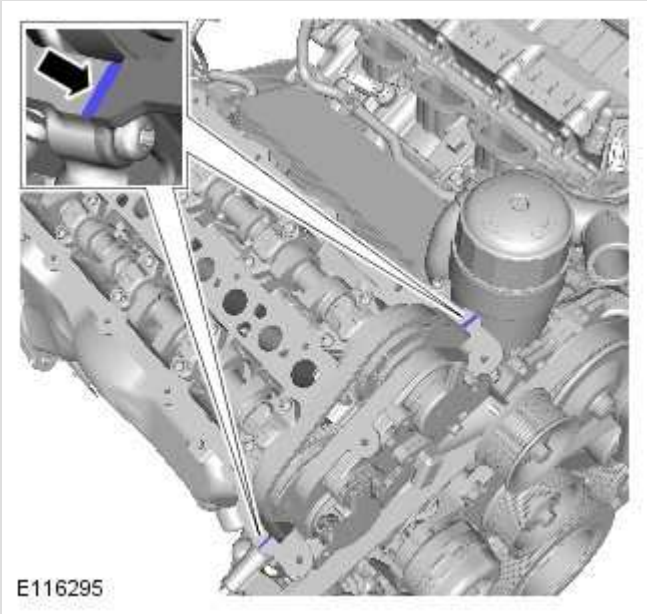
- Use only a plastic scraper when removing the sealing material.
- Use lint free cloth.
- Make sure that the mating faces are clean and free of corrosion and foreign material.
- Installation of the valve cover and tightening must be carried out within 7 minutes of applying the sealant.

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Apply two beads of silcone gasket sealant (Loctite 5901G or Loctite 5900) as shown on the illustration. The application of the sealant must be 1.5mm

cardiagn.com

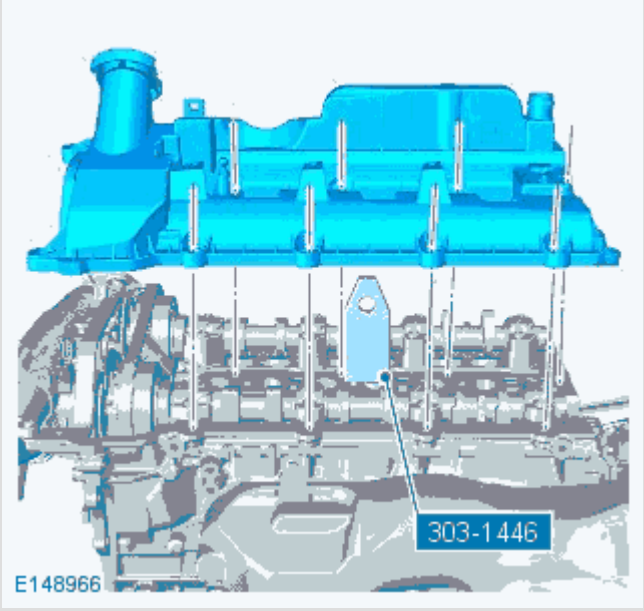
diameter 12mm long. Install the valve cover immediately after applying the sealant. The cover should be fitted directly to the head without smearing the sealant or the seals.



2.

NOTE:

LH illustration shown, RH is similar.



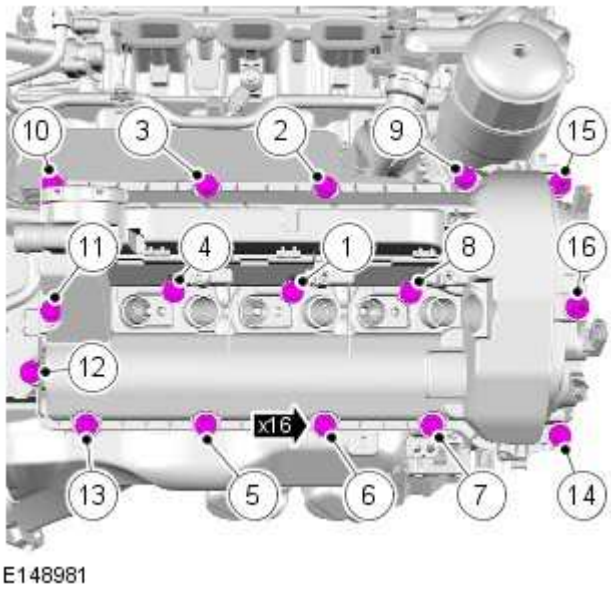
cardiagn.com

Special Tool(s): 303-1446

3.

NOTE:

Tighten the bolts in the indicated sequence.



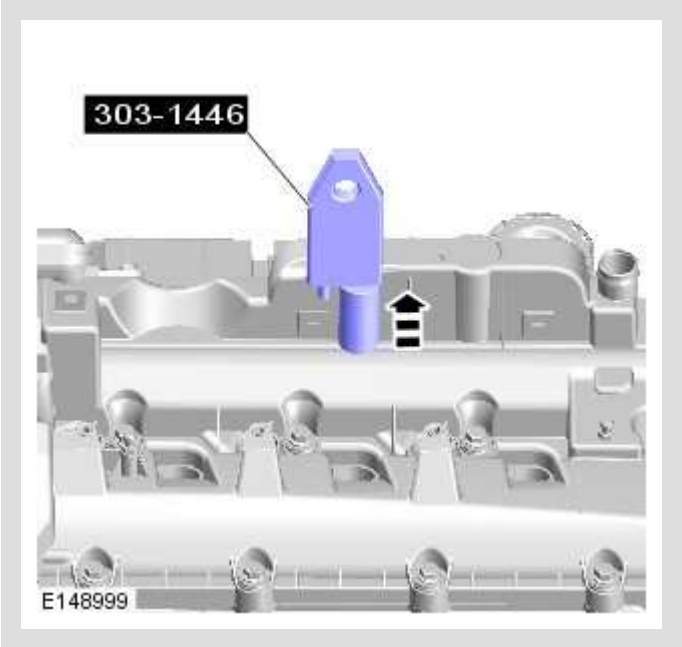
Torque: **13 Nm**

4.

NOTE:

LH illustration shown, RH is similar.

cardiagn.com



Special Tool(s): 303-1446

5. To install, reverse the removal procedure.

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

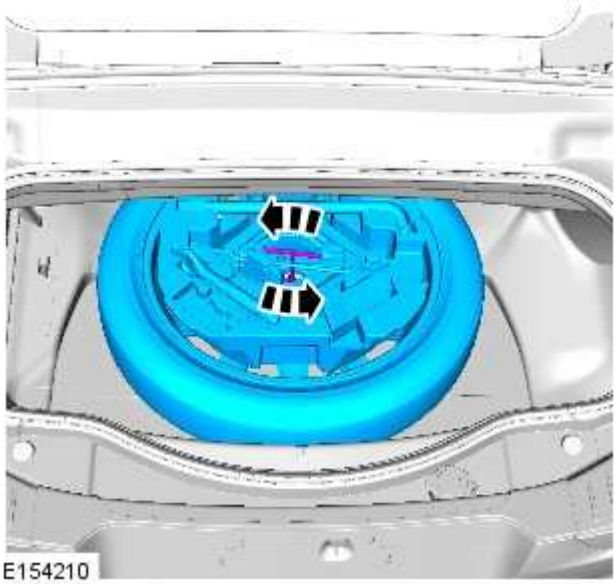
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

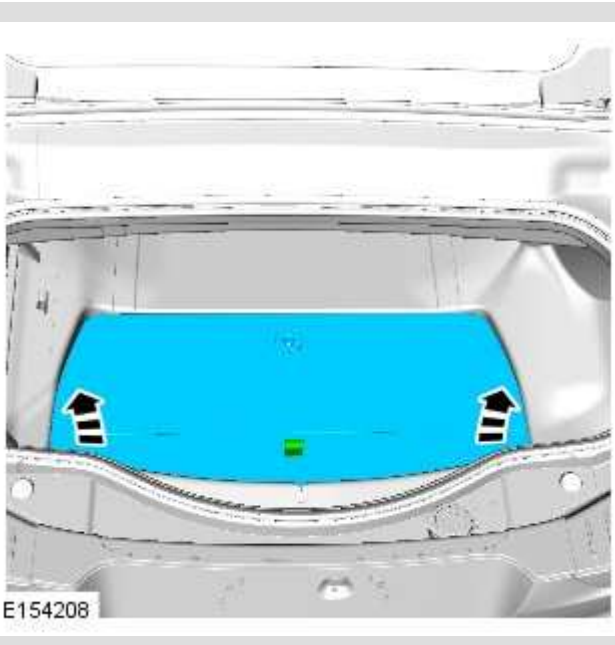
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

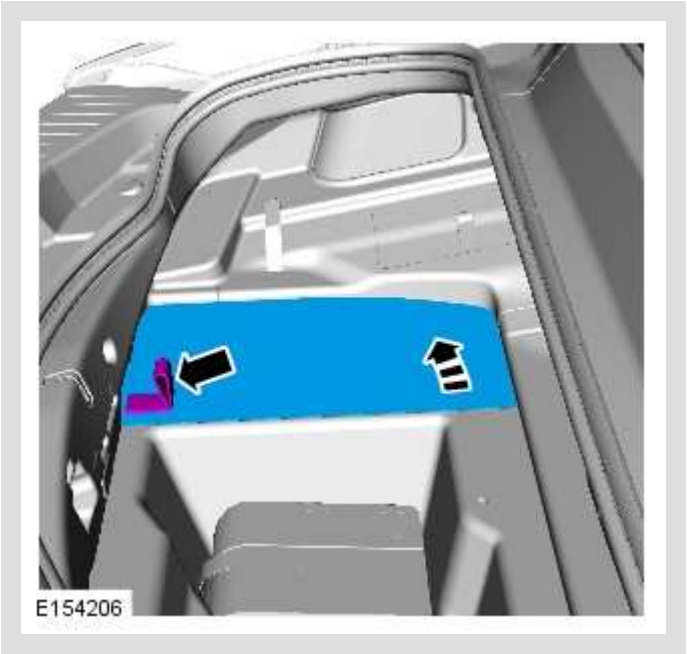


4.



cardiagn.com

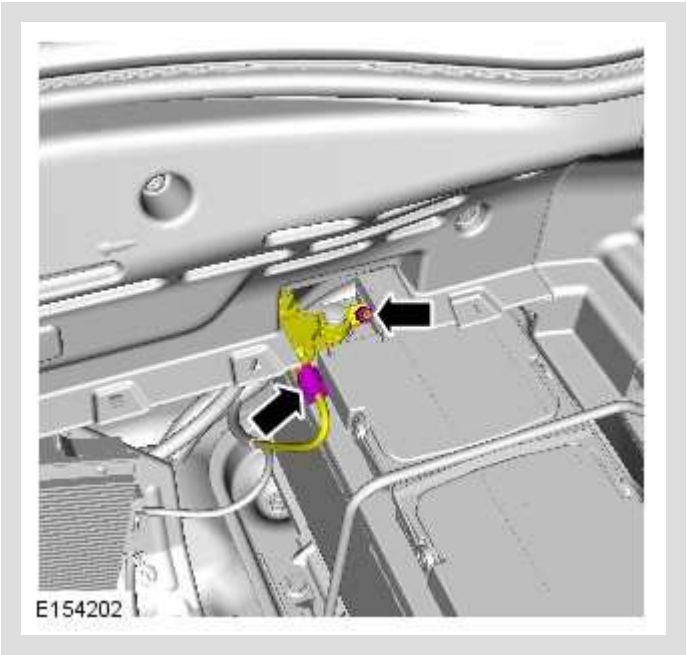
5.



6.

CAUTION:

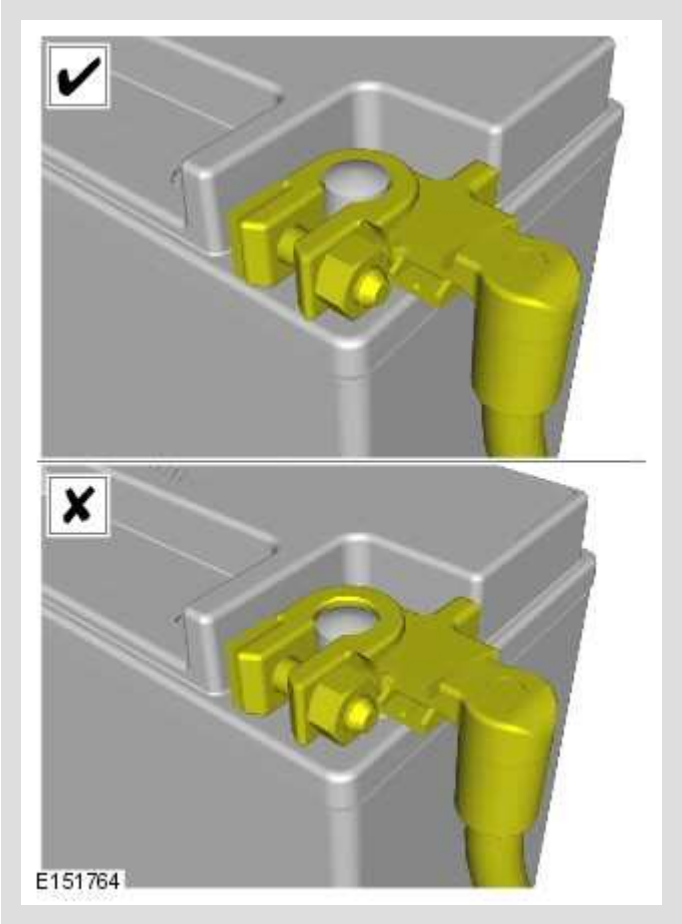
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

cardiagn.com

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

2015.0 F-TYPE (X152), 206-07

POWER BRAKE ACTUATION

BRAKE VACUUM PUMP (G1580129)

REMOVAL AND INSTALLATION

70.35.48	VACUUM PUMP - RENEW	ALL DERIVATIVES	0.7	USED WITHINS

REMOVAL

NOTE:

Removal steps in this procedure may contain installation details.

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

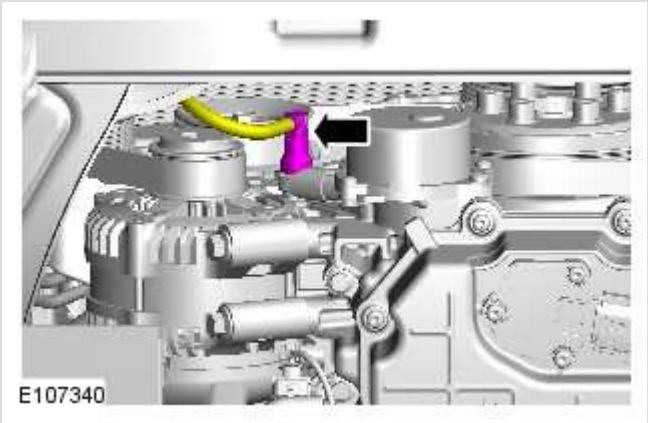
cardiagn.com

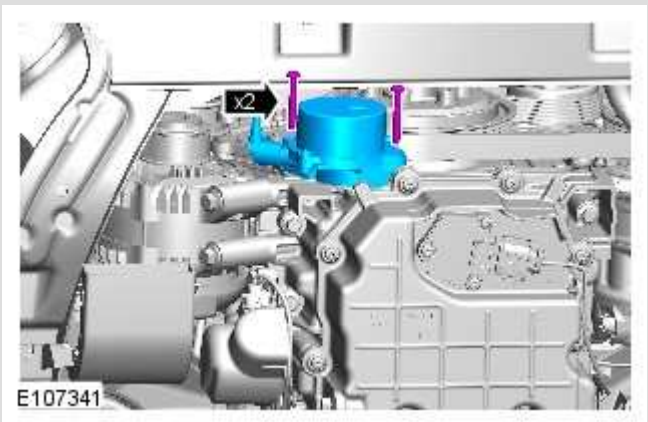
2. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

3. Drain the engine oil.
Refer to: Engine Oil Vacuum Draining and Filling (303-01B Engine - V8 S/C 5.0L Petrol, General Procedures).
Refer to: Engine Oil Vacuum Draining and Filling (303-01B Engine - V8 S/C 5.0L Petrol, General Procedures).

4. **NOTE:**

Make sure that all openings are sealed. Use new blanking caps.

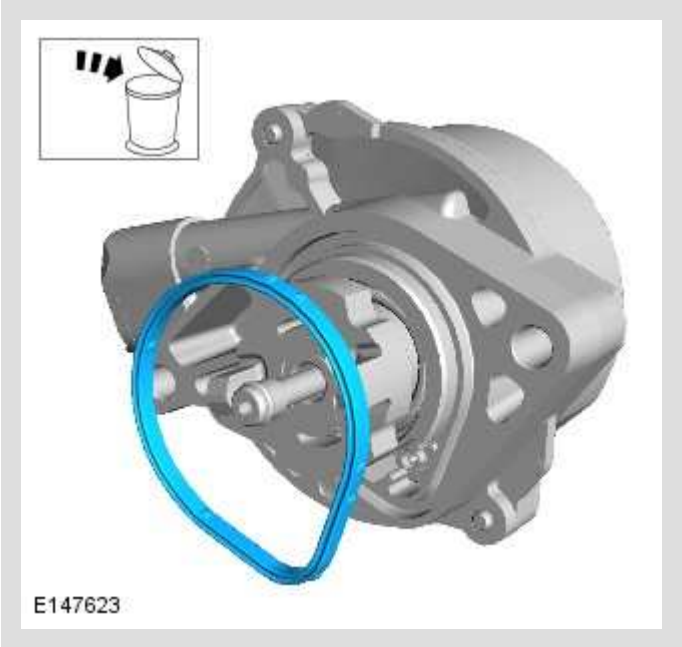


5. 

Torque: **12 Nm**

6.

cardiagn.com



INSTALLATION

1. **CAUTION:**

   A new O-ring seal is to be installed.

   To install, reverse the removal procedure.

2. Start engine and check the brake booster operation.

cardiagn.com

VALVE COVER LH (G1584120)

REMOVAL AND INSTALLATION

12.29.43	CAMSHAFT COVER - LEFT HAND - RENEW	3000 CC, AJ V6 (AJ126)	5.7	USED WITHINS	

SPECIAL TOOL(S)

303-1446

Valve Cover Alignment Tool

REMOVAL

NOTES:

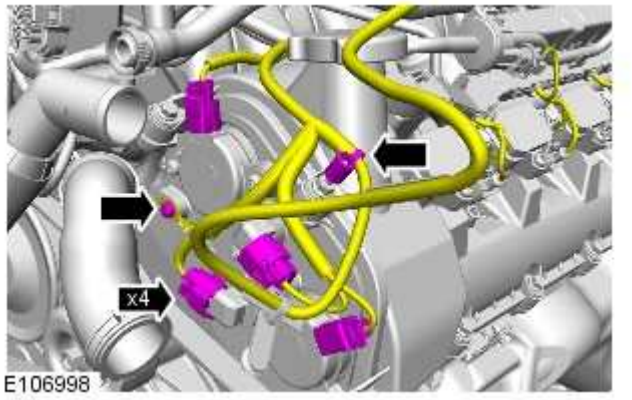
- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

cardiagn.com

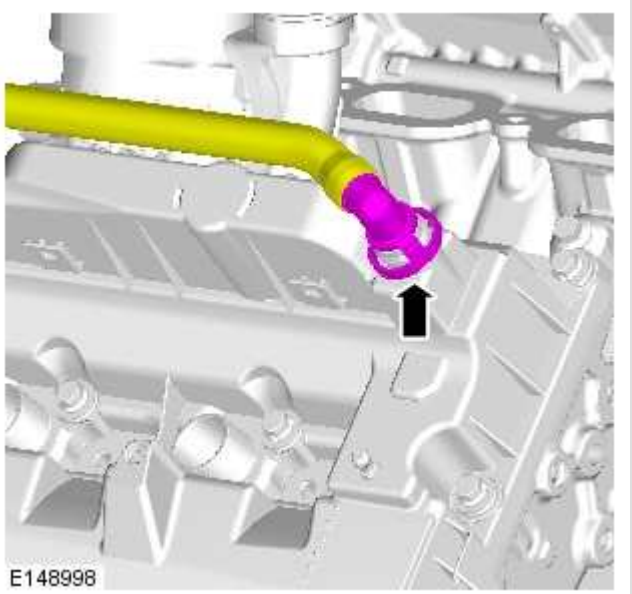
1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Supercharger (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

3. Refer to: Fuel Rail LH (303-04A Fuel Charging and Controls - V6 S/C 3.0L Petrol, Removal and Installation).

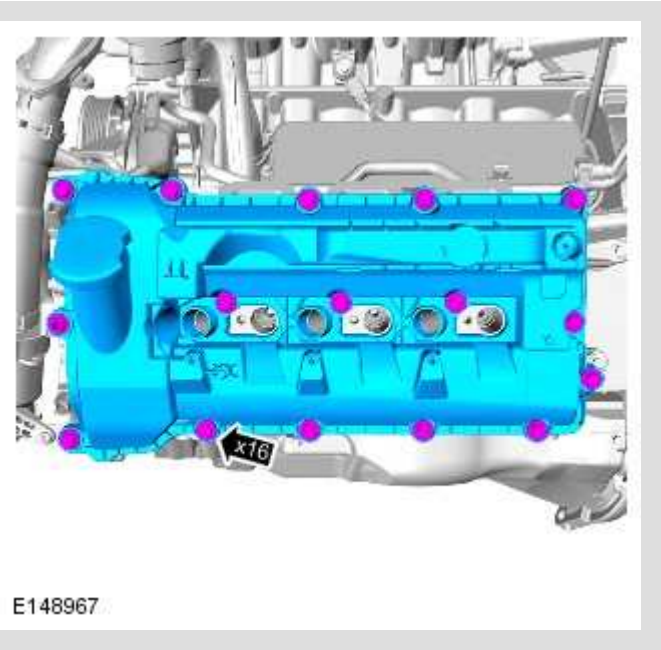
4. 

Torque: **10 Nm**

5. 

6.

cardiagn.com



INSTALLATION

1.

CAUTIONS:

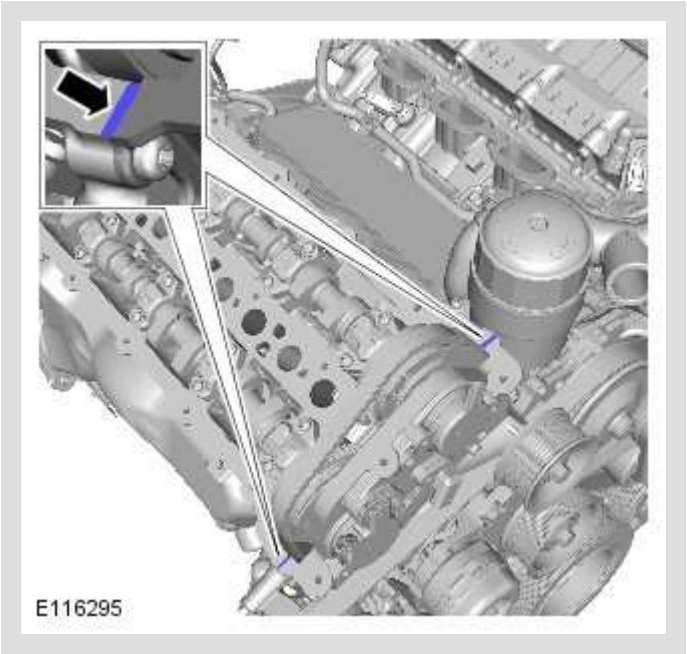
- Use only a plastic scraper when removing the sealing material.
- Use lint free cloth.
- Make sure that the mating faces are clean and free of corrosion and foreign material.
- Installation of the valve cover and tightening must be carried out within 7 minutes of applying the sealant.

NOTES:

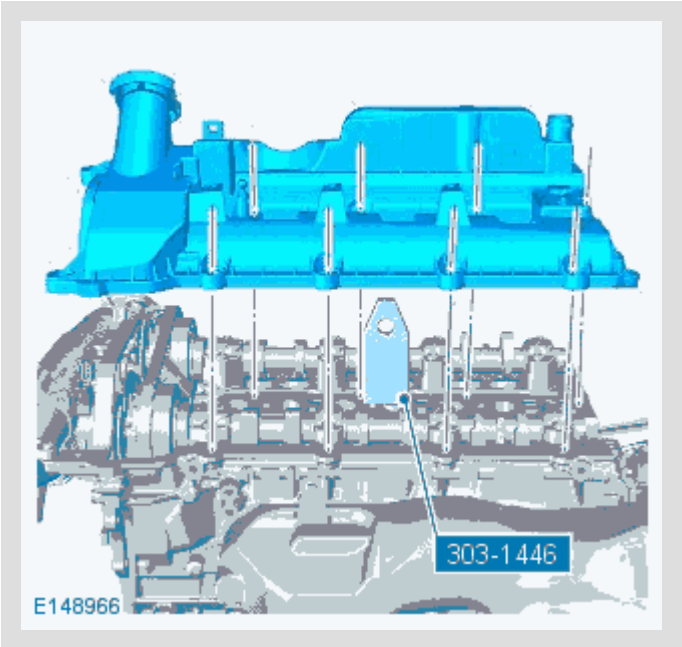
- RH illustration shown, LH is similar.

cardiagn.com

- Some variation in the illustrations may occur, but the essential information is always correct.
- Apply two beads of silcone gasket sealant (Loctite 5901G or Loctite 5900) as shown on the illustration. The application of the sealant must be 1.5mm diameter 12mm long. Install the valve cover immediately after applying the sealant. The cover should be fitted directly to the head without smearing the sealant or the seals.



2.

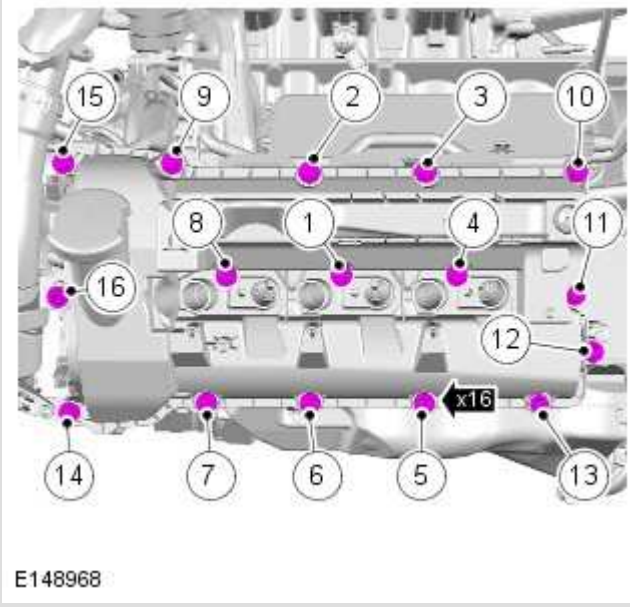


cardiagn.com

Special Tool(s): 303-1446

3. **NOTE:**

Tighten the bolts in the indicated sequence.



Torque: **13 Nm**

4.

Special Tool(s): 303-1446

5. To install, reverse the removal procedure.

cardiagn.com

2015.0 F-TYPE (X152), 303-03

ENGINE COOLING - V6 S/C 3.0L PETROL

ELECTRIC THERMOSTAT (G1780433)

REMOVAL AND INSTALLATION

26.45.24	ELECTRIC THERMOSTAT	3000 CC, AJ V6 (AJ126)	1.3	USED WITHINS

REMOVAL

1. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

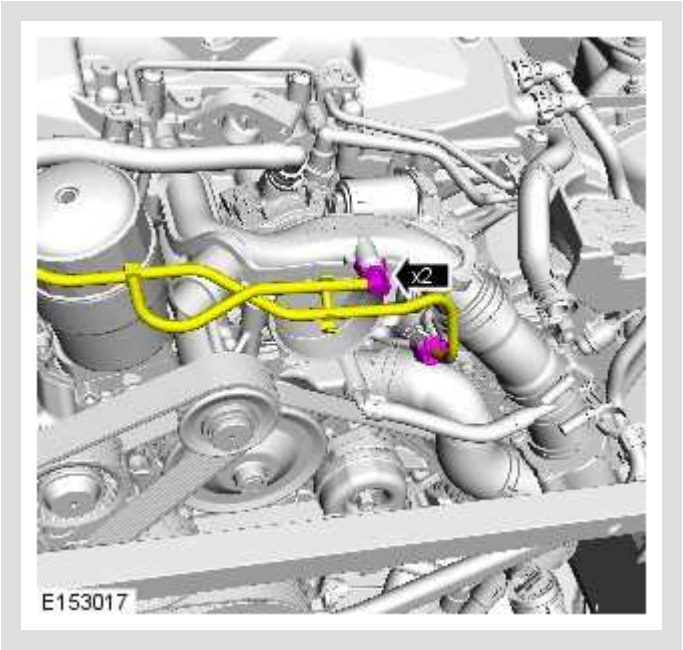
2. Refer to: Cooling System Partial Draining and Vacuum Filling (303-03A Engine Cooling - V6 S/C 3.0L Petrol, General Procedures).

3. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

4. Refer to: Air Cleaner Outlet Pipe LH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

cardiagn.com

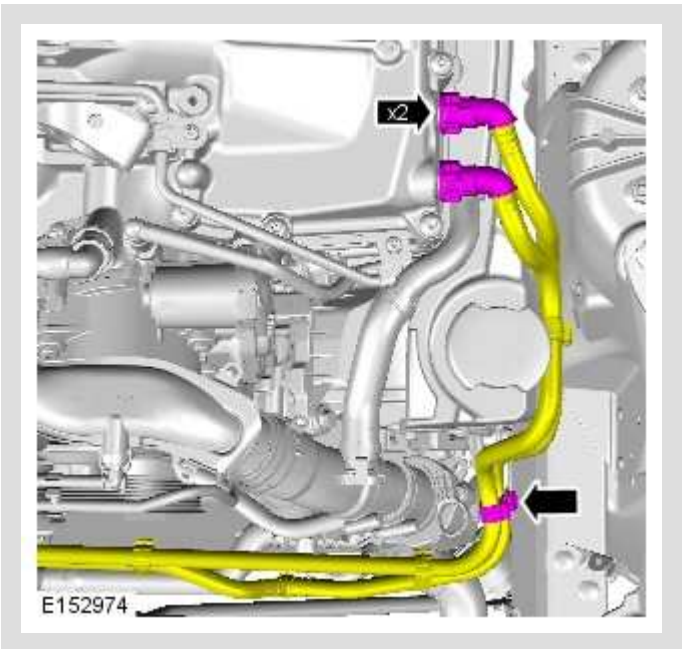
5.



6.

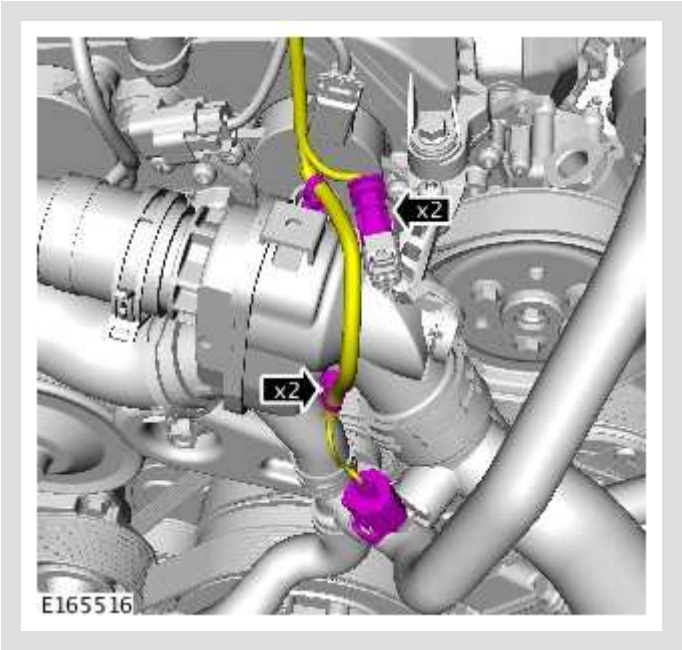
CAUTION:

Be prepared to collect escaping coolant.



7.

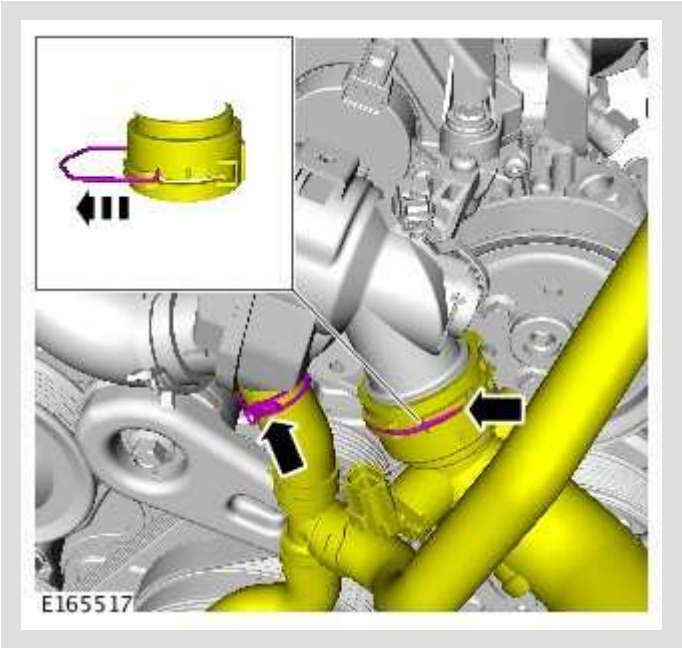
cardiagn.com



8.

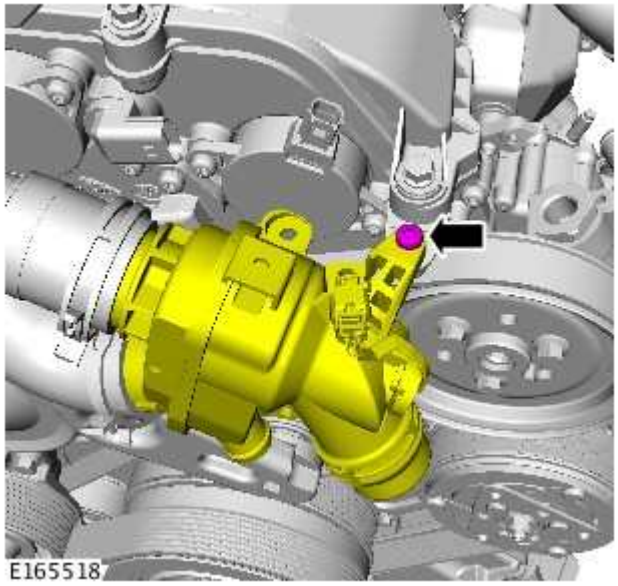
CAUTION:

Be prepared to collect escaping coolant.



cardiagn.com

9.



Torque: **9 Nm**

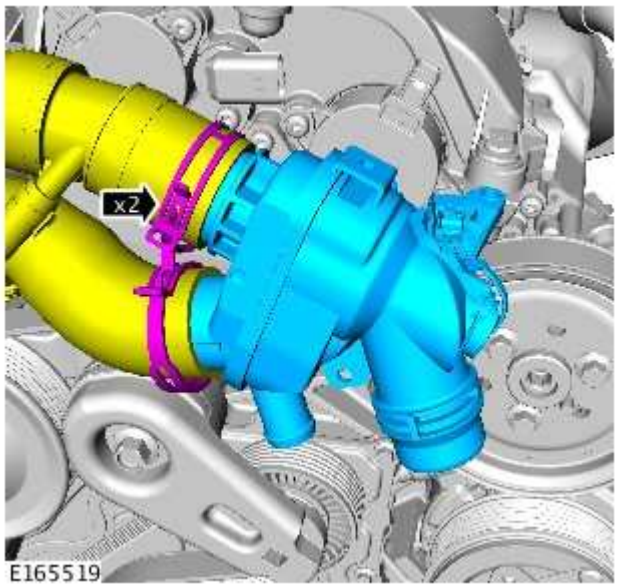
10.

CAUTION:

Be prepared to collect escaping coolant.

NOTE:

The retaining clips cannot be removed from the pipe.



cardiagn.com

INSTALLATION

1. To install, reverse the removal procedure.

2015.0 F-TYPE (X152), 303-01

ENGINE - V8 S/C 5.0L PETROL

VALVE COVER LH (G1584152)

REMOVAL AND INSTALLATION

12.29.43	CAMSHAFT COVER - LEFT HAND - RENEW	3000 CC, AJ V6 (AJ126)	5.7	USED WITHINS	

SPECIAL TOOL(S)

303-1446

Valve Cover Alignment Tool

cardiagn.com

REMOVAL

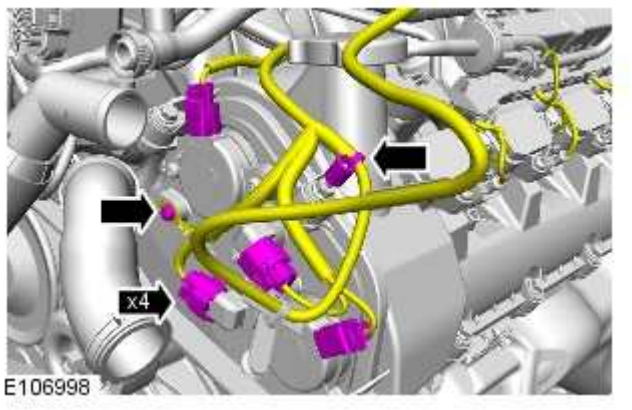
NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show vehicles without supercharger, but the essential information shown is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Supercharger (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

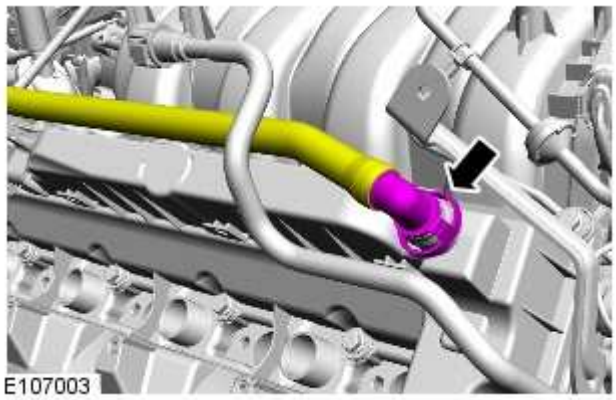
3. Refer to: Fuel Rail RH (303-04A Fuel Charging and Controls - V6 S/C 3.0L Petrol, Removal and Installation).

4. 

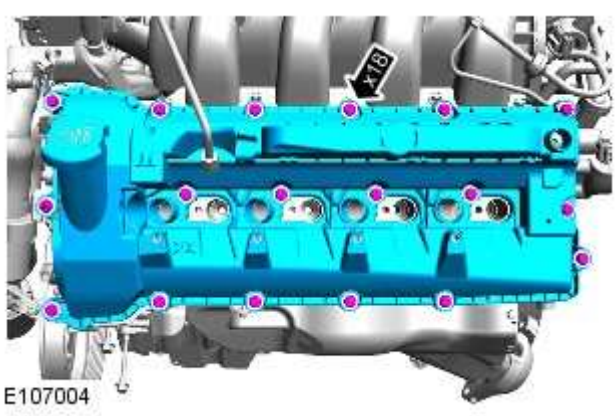
Torque: **10 Nm**

cardiagn.com

5.



6.



INSTALLATION

1.

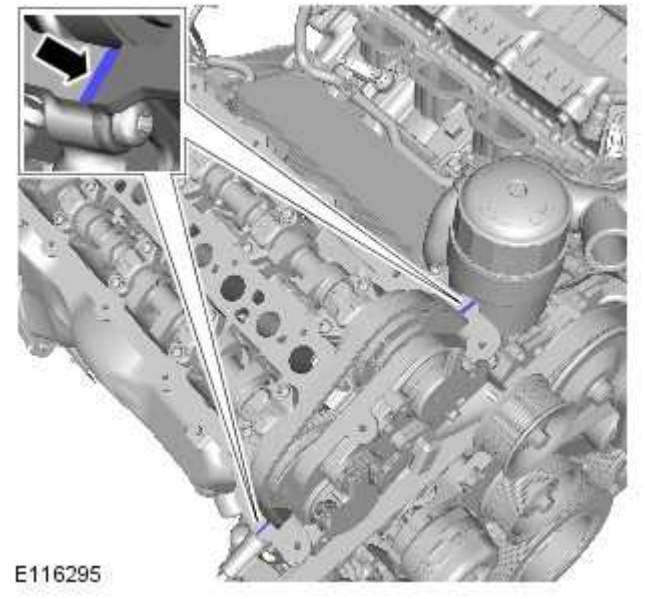
CAUTIONS:

- Use only a plastic scraper when removing the sealing material.
- Use lint free cloth.
- Make sure that the mating faces are clean and free of corrosion and foreign material.
- Installation of the valve cover and tightening must be carried out within 7 minutes of applying the sealant.

cardiagn.com

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Apply two beads of silcone gasket sealant (Loctite 5901G or Loctite 5900) as shown on the illustration. The application of the sealant must be 1.5mm diameter 12mm long. Install the valve cover immediately after applying the sealant. The cover should be fitted directly to the head without smearing the sealant or the seals.



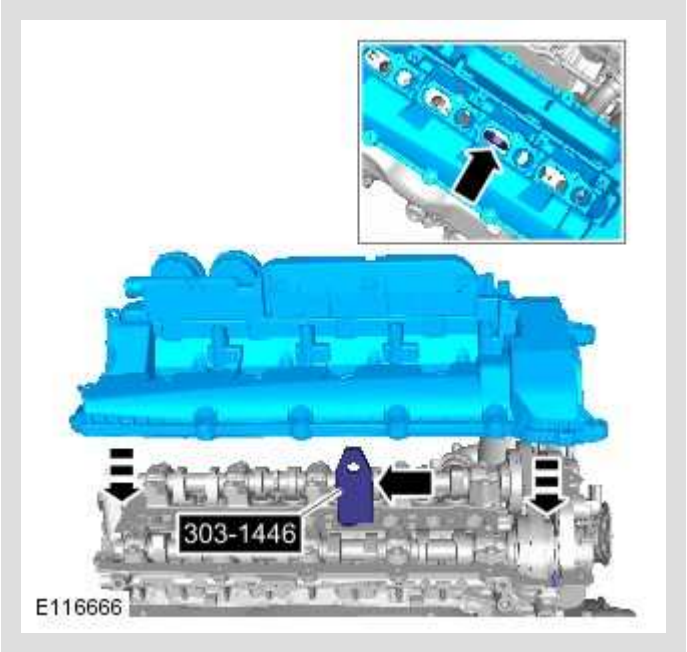
To install, reverse the removal procedure.

2.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

cardiagn.com

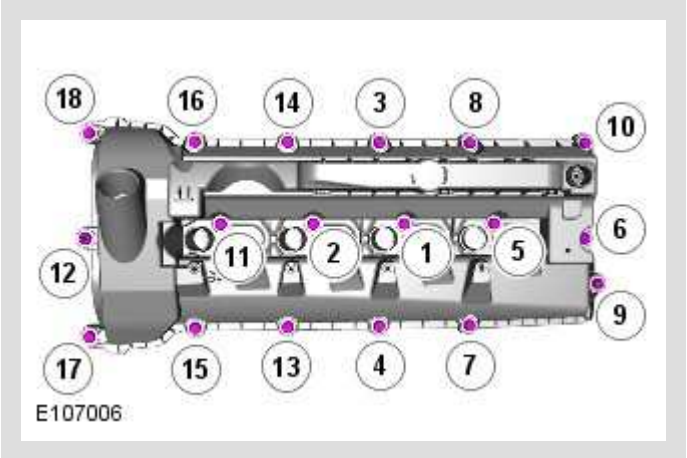


Special Tool(s): 303-1446

3.

NOTE:

Tighten the bolts in the indicated sequence.



Torque: **13 Nm**

cardiagn.com

ACCESSORY DRIVE - V6 S/C 3.0L PETROL

ACCESSORY DRIVE BELT (G1580332)

REMOVAL AND INSTALLATION

12.10.40	DRIVE BELT - FRONT END ACCESSORY DRIVE - RENEW	ALL DERIVATIVES	0.9	USED WITHINS	

REMOVAL

NOTES:

- Removal steps in this procedure may contain installation details.
- Engine shown removed for clarity.

All vehicles

1. Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Air Cleaner Outlet Pipe T-Connector (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

2.

cardiagn.com

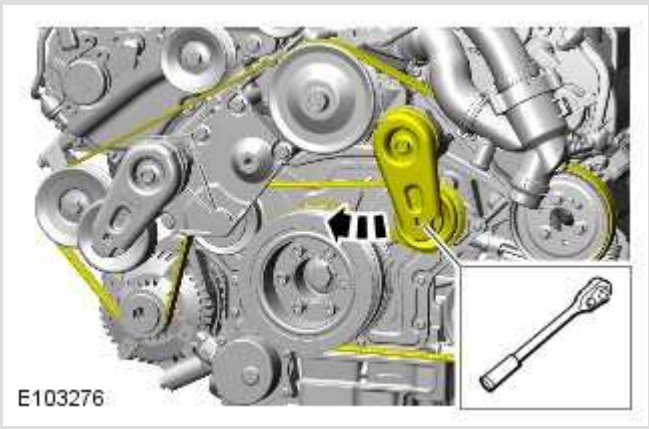
Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

Vehicles with hydraulic power steering

1.

NOTE:

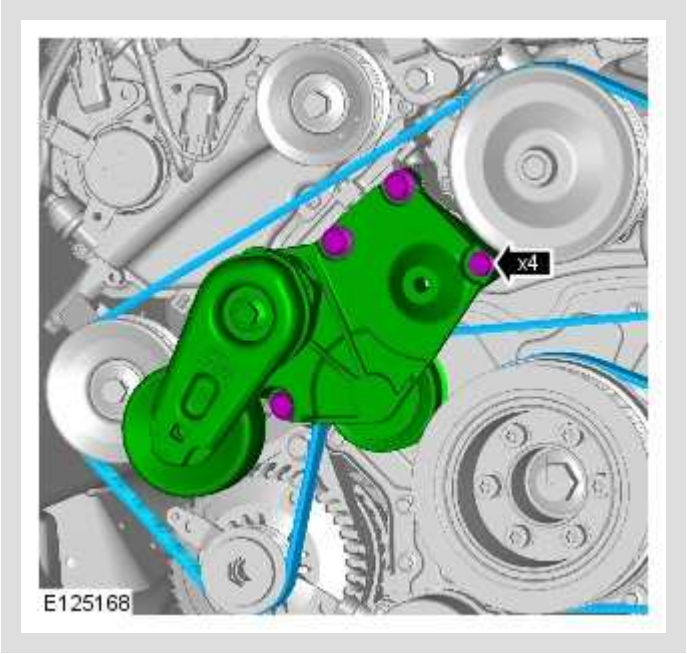
Note the fitted position of the accessory drive belt.



2. Refer to: Supercharger Belt Idler Pulley (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Supercharger Belt Idler Pulley (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

3.

cardiagn.com



Torque: **25 Nm**

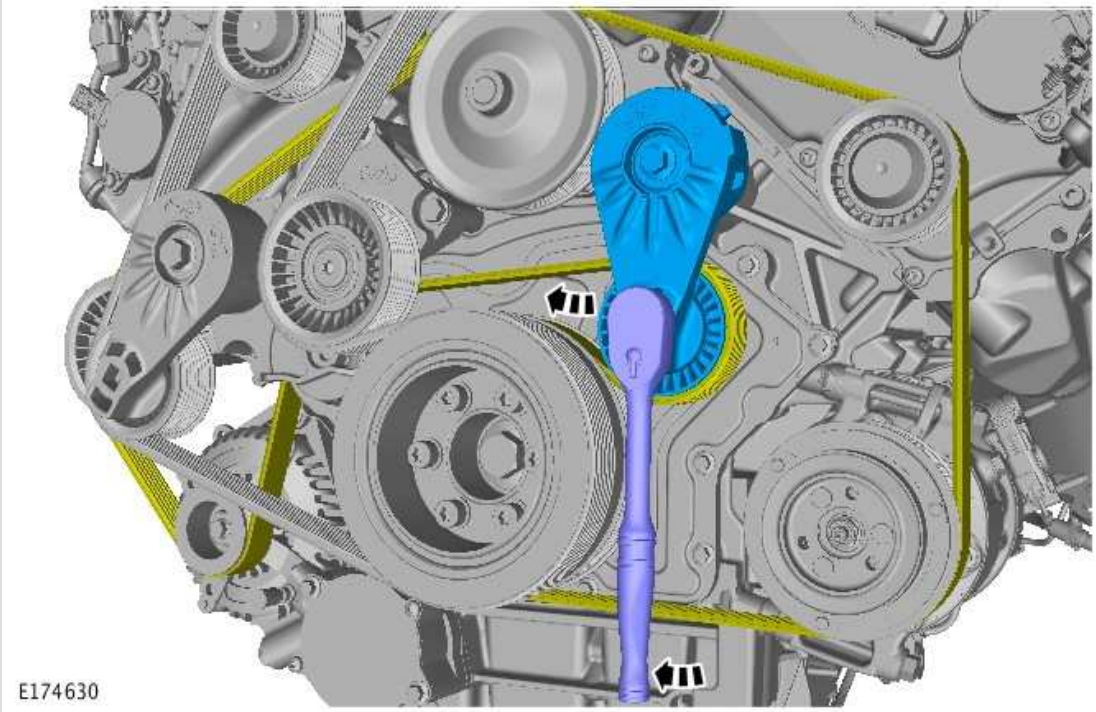
Vehicles with electric power steering

1.

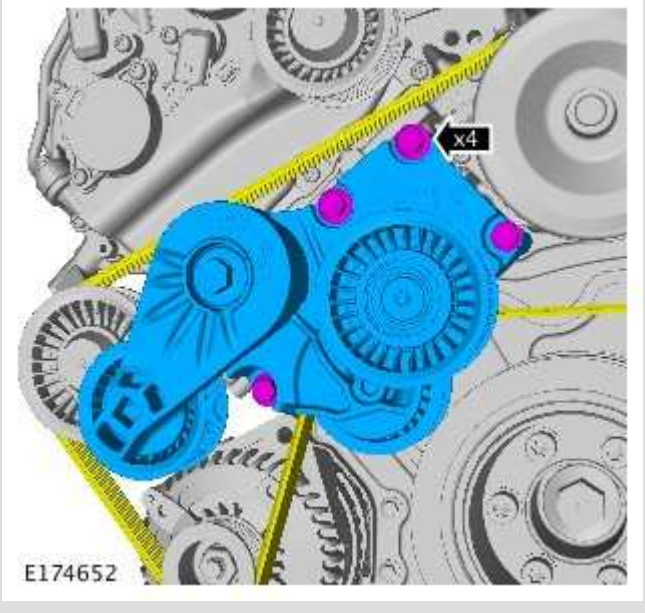
NOTE:

Note the fitted position of the accessory drive belt.

cardiagn.com



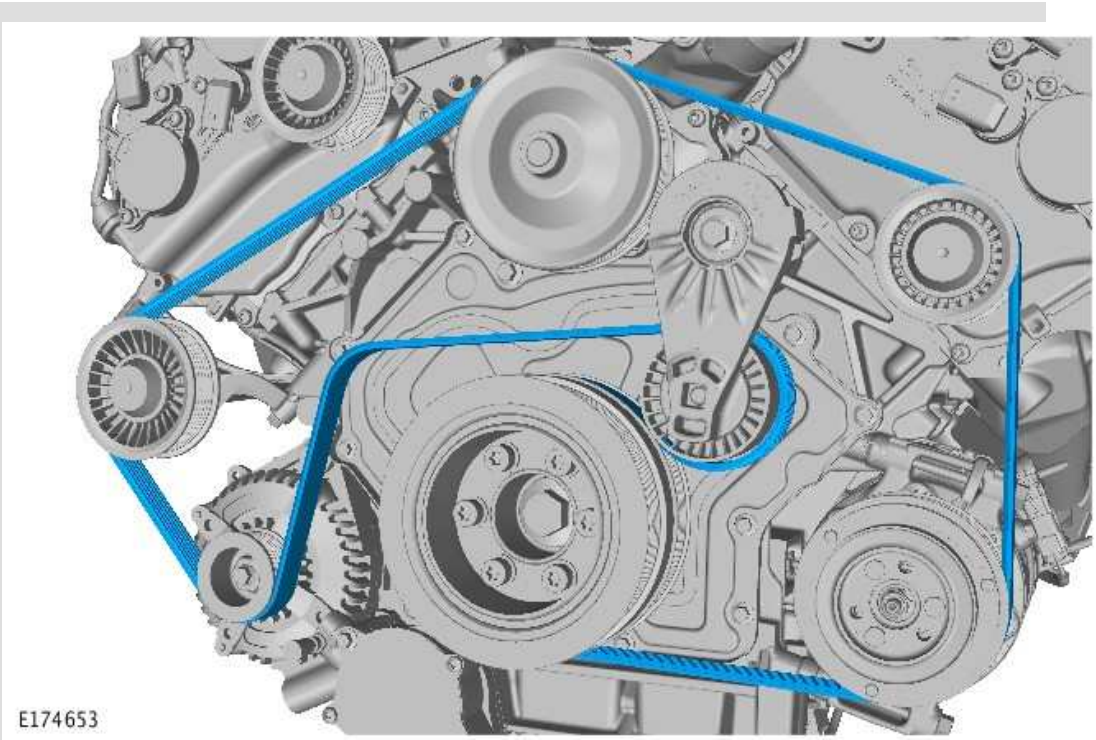
2.



Torque: **25 Nm**

cardiagn.com

3.



INSTALLATION

1.

CAUTION:

Make sure that the accessory drive belt is correctly located on each pulley.

To install, reverse the removal procedure.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

TIMING DRIVE COMPONENTS (G1584118)

REMOVAL AND INSTALLATION

12.65.13	TIMING CHAINS, GEARS AND TENSIONERS - ENGINE SET - RENEW	3000 CC, AJ V6 (AJ126)	15.6	USED WITHINS	

SPECIAL TOOL(S)

303-1445

Timing Tool – Camshaft Alignment

cardiagn.com

303-1452

Camshaft Rotating Tool

303-1482

Tensioner Tool

JLR-303-1303

Timing Tool

cardiagn.com

E152576	**JLR-303-1304** Locking Tool

REMOVAL

CAUTION:

Check all timing components for wear and install new components if required.

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

1. Disconnect the battery ground cable.
   Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2.

cardiagn.com

WARNING:

Make sure to support the vehicle with axle stands.

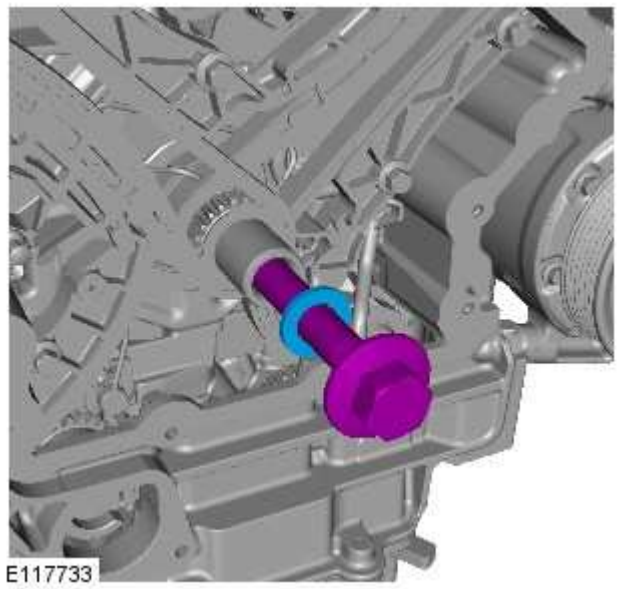
Raise and support the vehicle.

3. Remove the starter motor.
Refer to: Starter Motor (303-06A, Removal and Installation).
Refer to: Starter Motor (303-06B, Removal and Installation).

4. Remove the timing cover.
Refer to: Timing Cover (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

5. **CAUTION:**

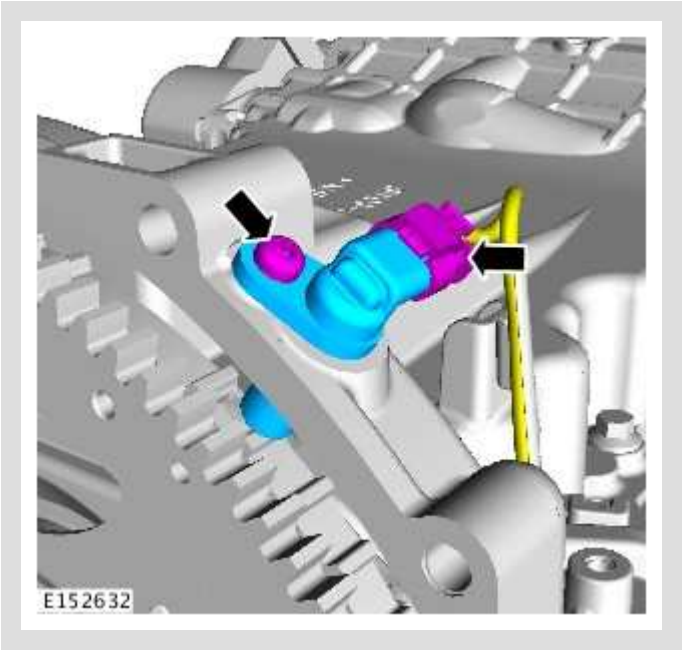
An M16 washer must be used to prevent damage to the crankshaft on installation.



Install the crankshaft pulley bolt.
Torque: **20 Nm**

6.

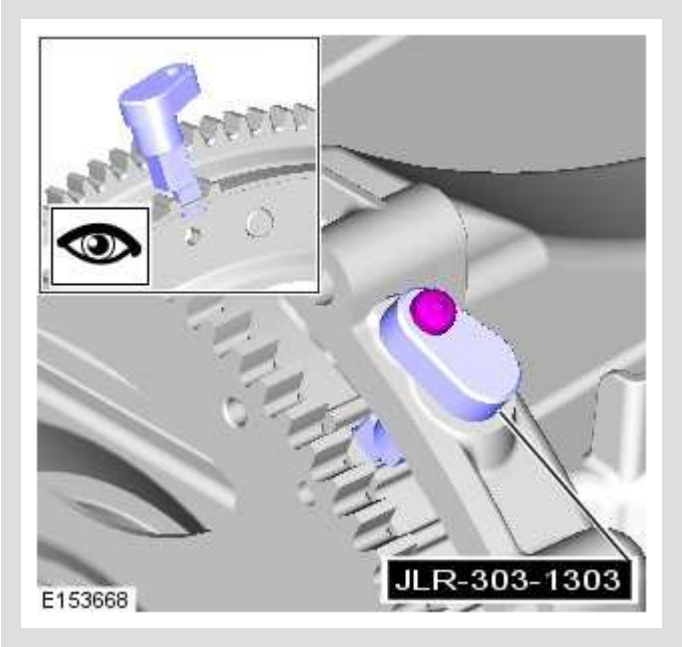
cardiagn.com



7.

CAUTION:

Only rotate the crankshaft clockwise.

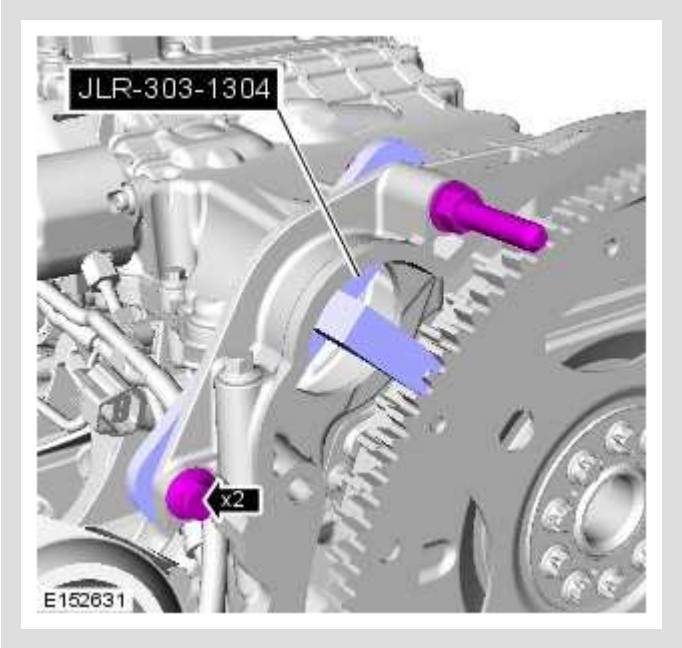


Install the special tool.

Special Tool(s): JLR-303-1303

8.

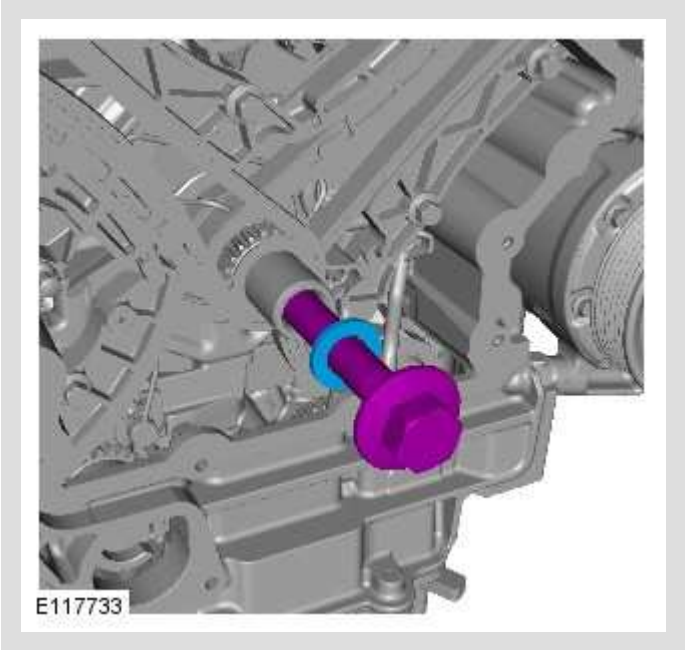
cardiagn.com



Install the special tool.

Special Tool(s): JLR-303-1304

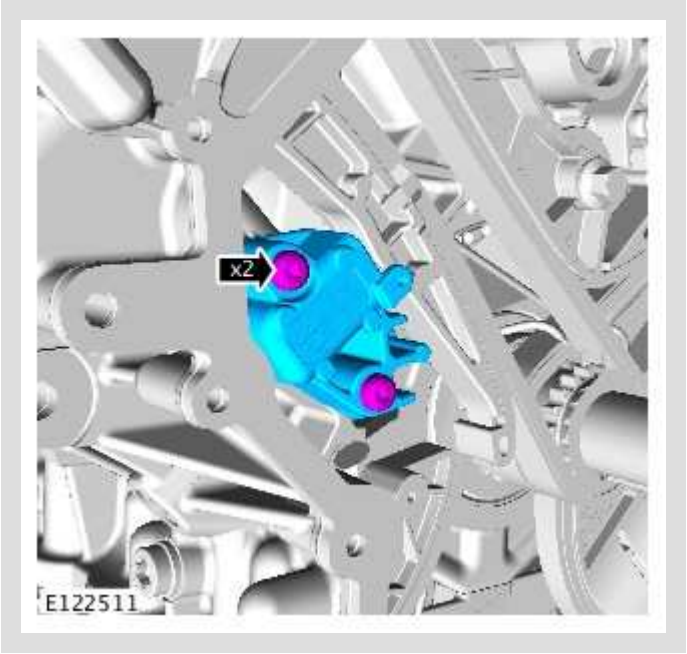
9.



Remove the crankshaft pulley bolt.

10.

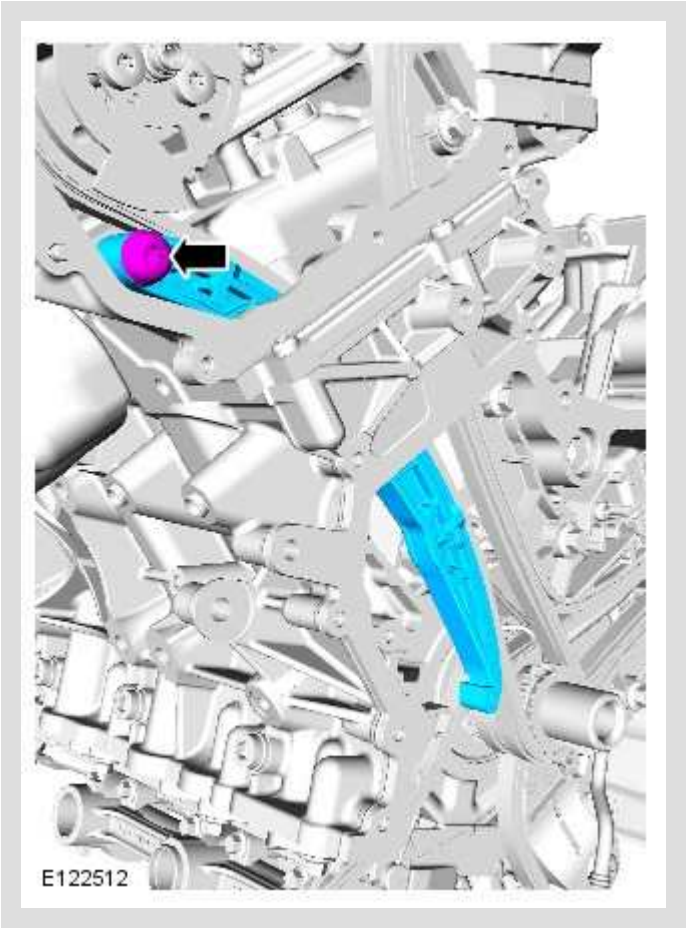
cardiagn.com



Remove the timing chain tensioner.

11.

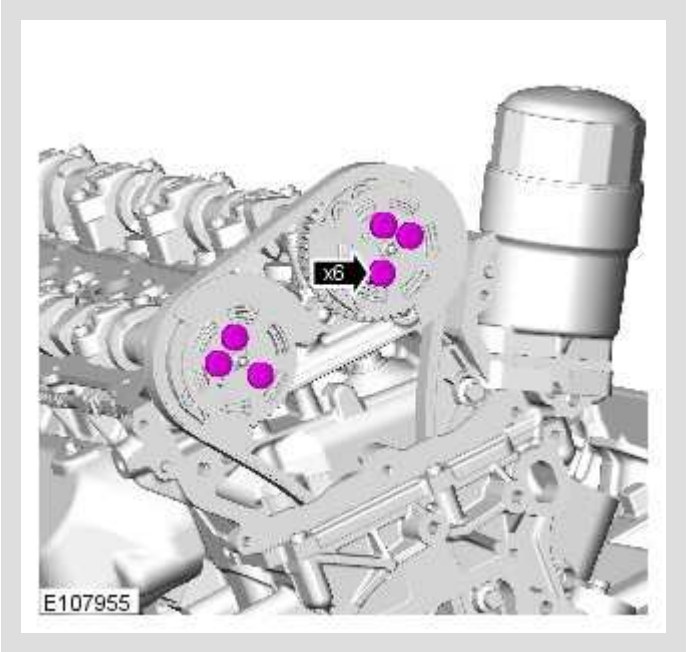
cardiagn.com



Remove the timing chain guide.

12.

cardiagn.com



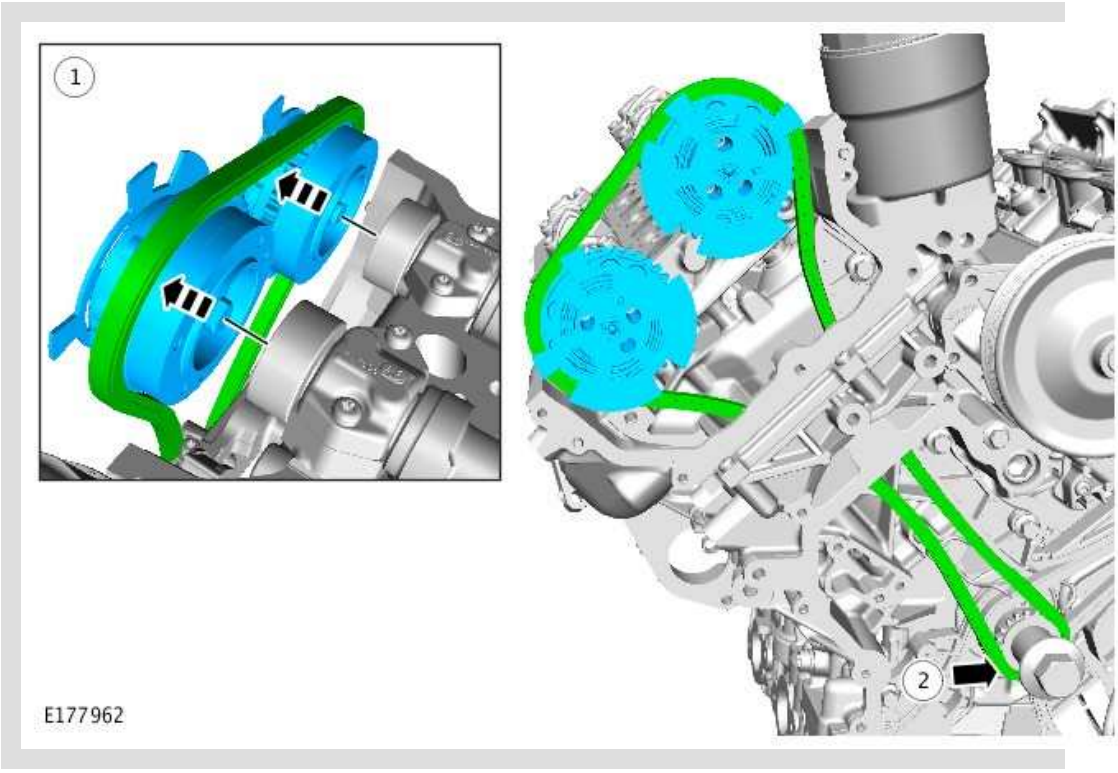
Remove the variable valve timing (VVT) unit bolts.

13.

CAUTION:

If the variable valve timing (VVT) units are knocked or dropped then new VVT(s) must be installed.

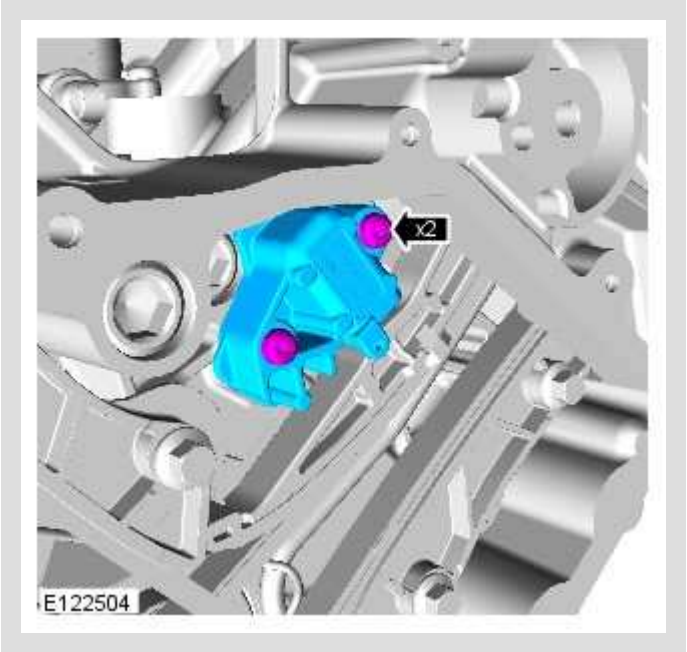
cardiagn.com



Remove the timing chain and VVT units.

14.

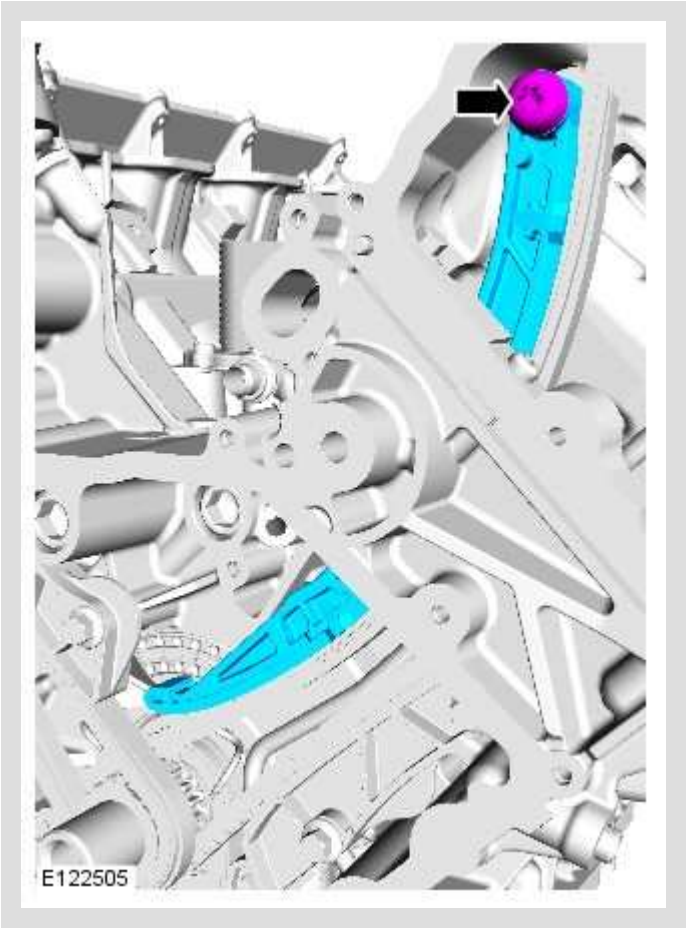
cardiagn.com



Remove the timing chain tensioner.

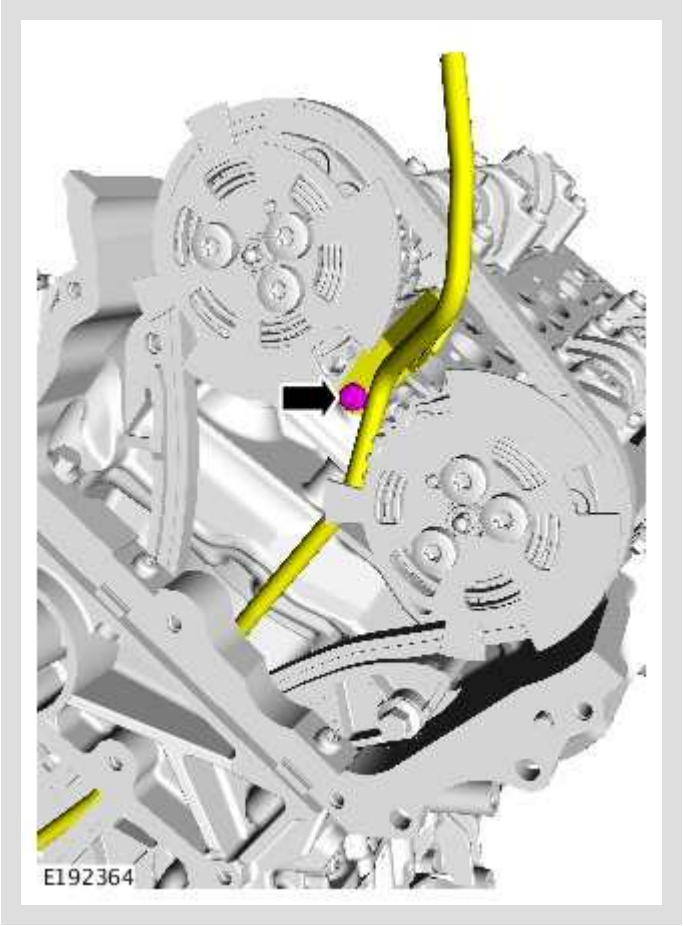
15.

cardiagn.com



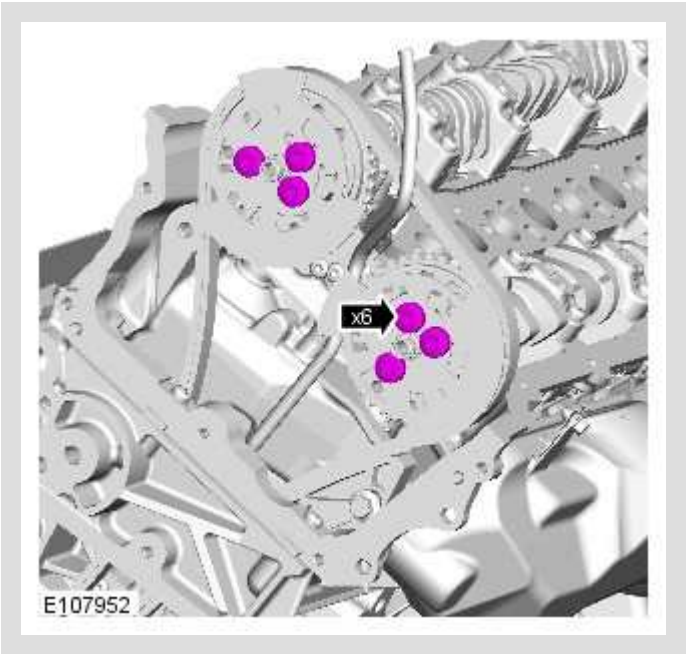
Remove the timing chain guide.

cardiagn.com



Release the oil drain tube.

17.



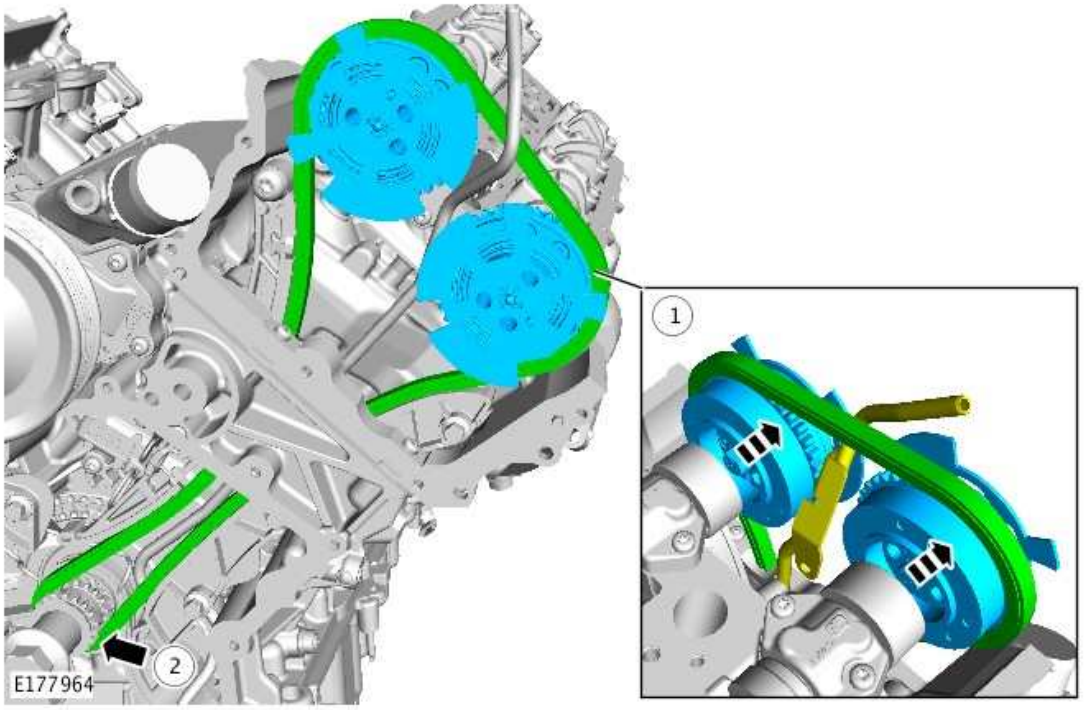
Remove the variable valve timing (VVT) unit bolts.

18.

cardiagn.com

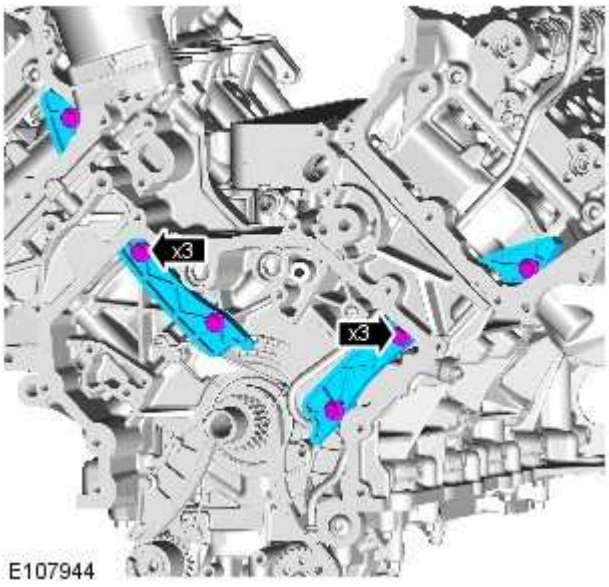
CAUTION:

If the VVT is knocked or dropped then new VVT(s) must be installed.



Remove the timing chain with the VVT units.

19.

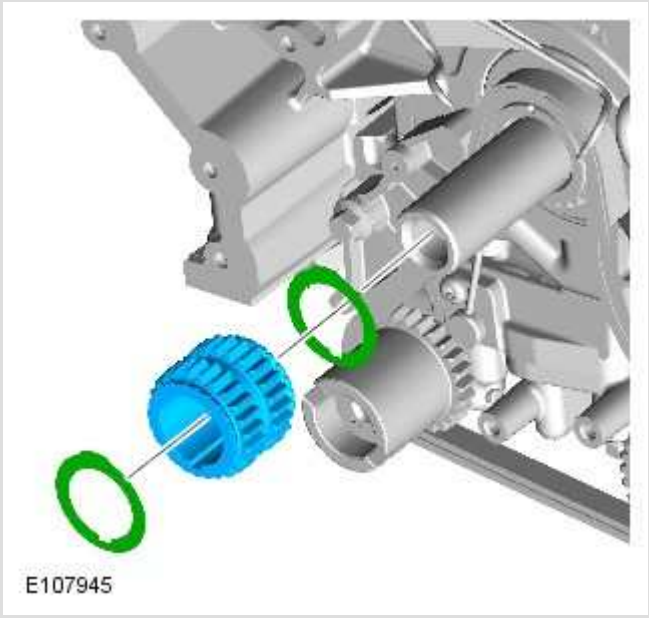


20.

cardiagn.com

CAUTION:

Discard the friction washer.



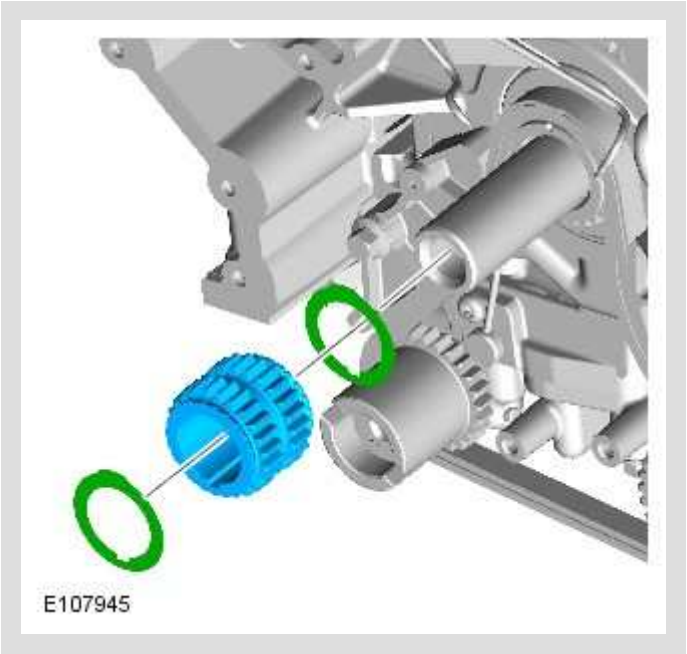
INSTALLATION

1.

CAUTION:

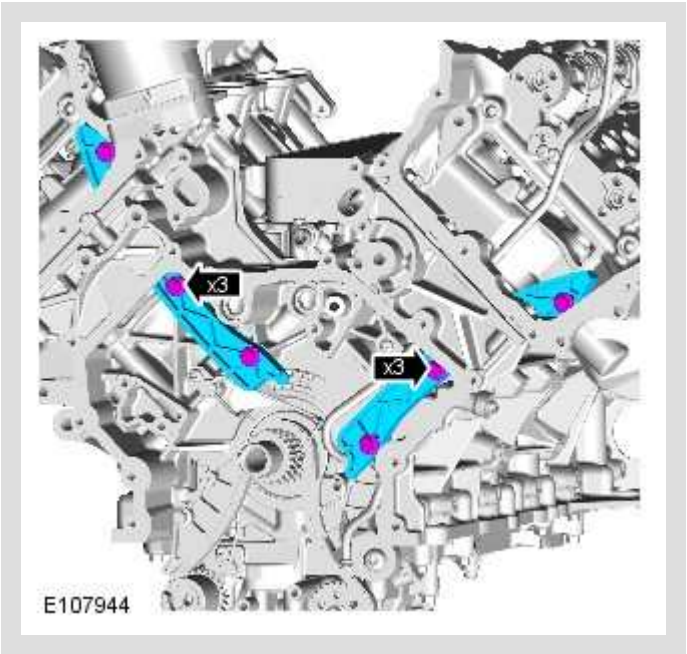
Install a new friction washer.

cardiagn.com



2.

cardiagn.com

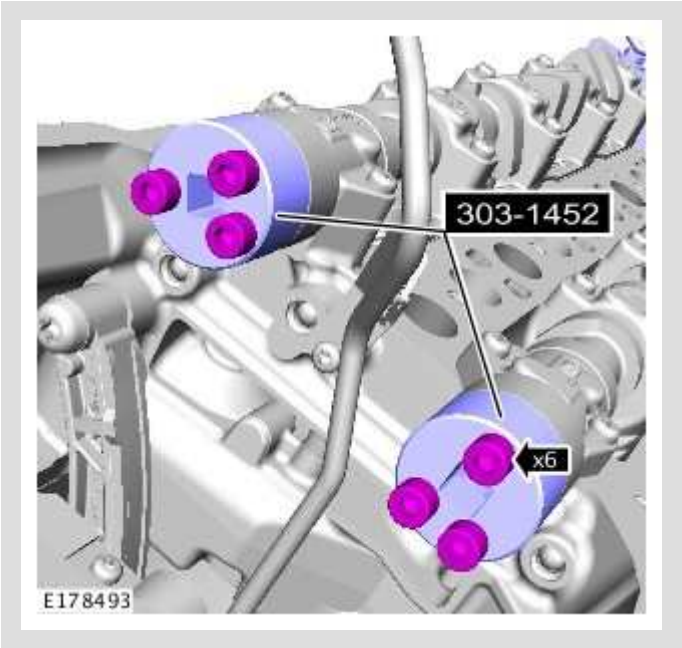


Install the timing chain fixed guides.

Torque: **12 Nm**

3.

cardiagn.com



Install the special tool to each Camshaft.

Special Tool(s): 303-1452

Torque: **10 Nm**

4.

cardiagn.com

Carefully rotate the camshafts if the position is not as shown.

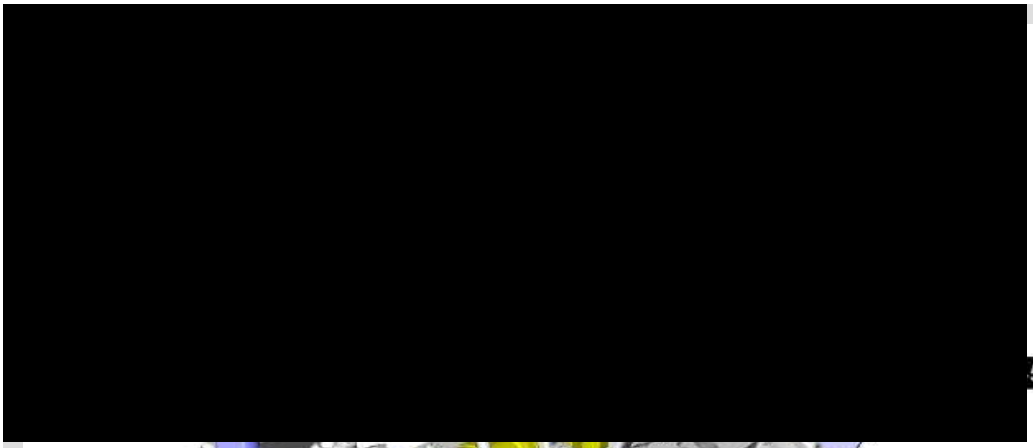
5.

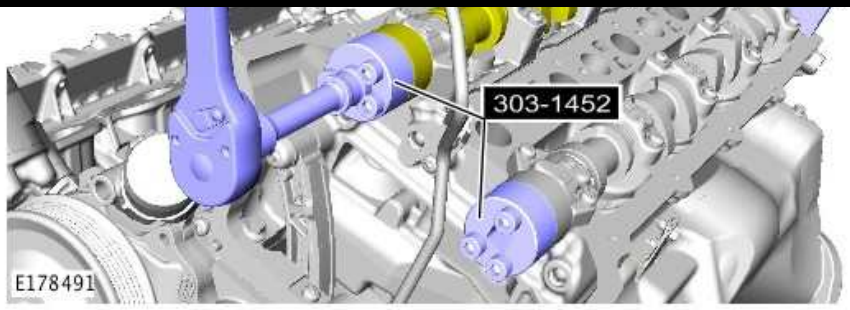
CAUTIONS:

Do not overturn the camshafts.

Tighten the wing nuts finger tight. Failure to follow this instruction may result in damage to the components.

cardiagn.com

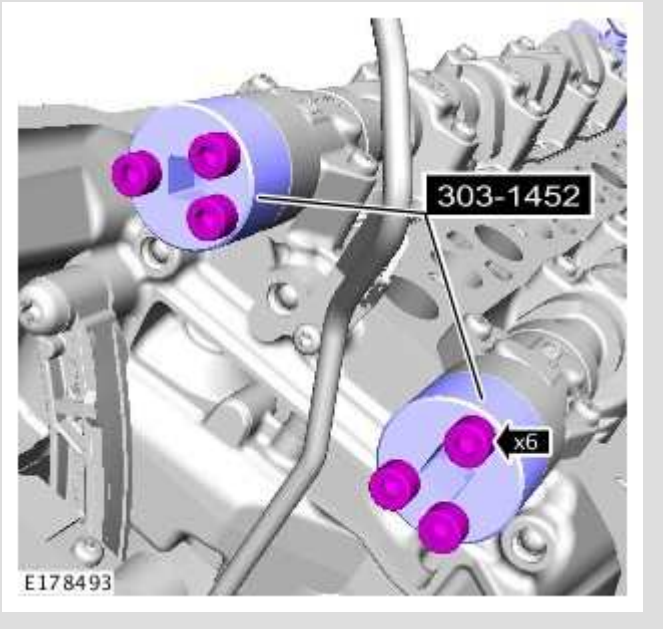




Special Tool(s): 303-1452

Using a suitable tool, carefully rock the camshaft clockwise then anti-clockwise. Turn the special tool locking nuts until there is no movement left in camshafts. Repeat this step for both camshafts.

6.



cardiagn.com

Remove the special tool from each Camshaft.

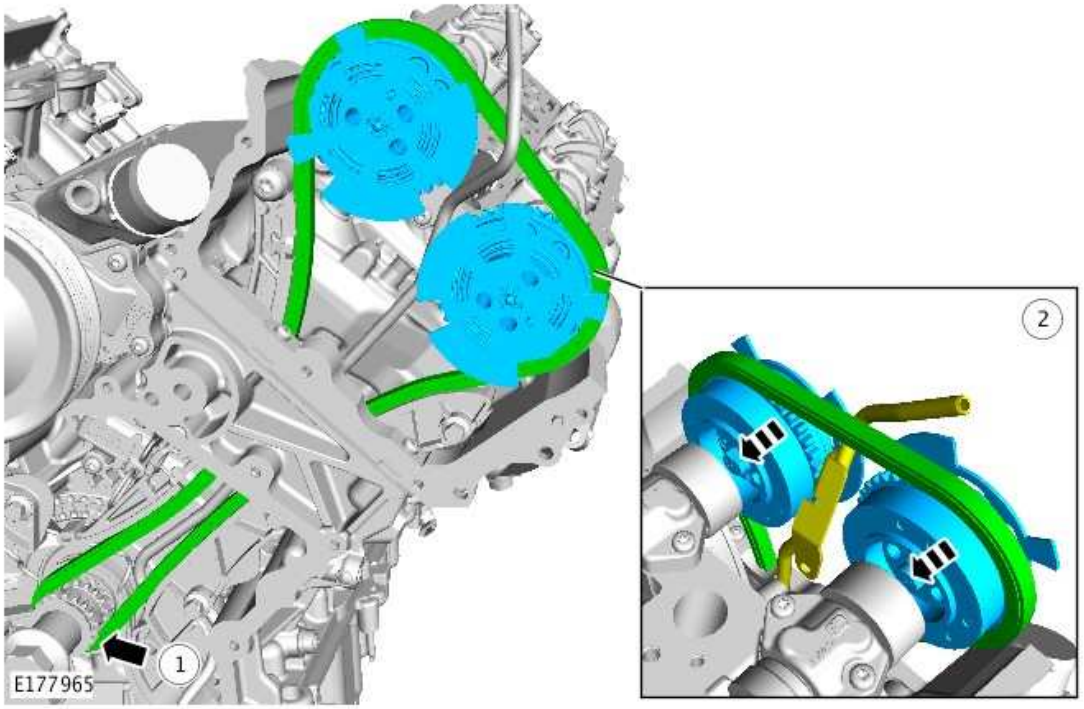
Special Tool(s): 303-1452

7.

CAUTIONS:

Do not allow the camshaft to rotate.

If the VVT is knocked or dropped then new VVT(s) must be installed.



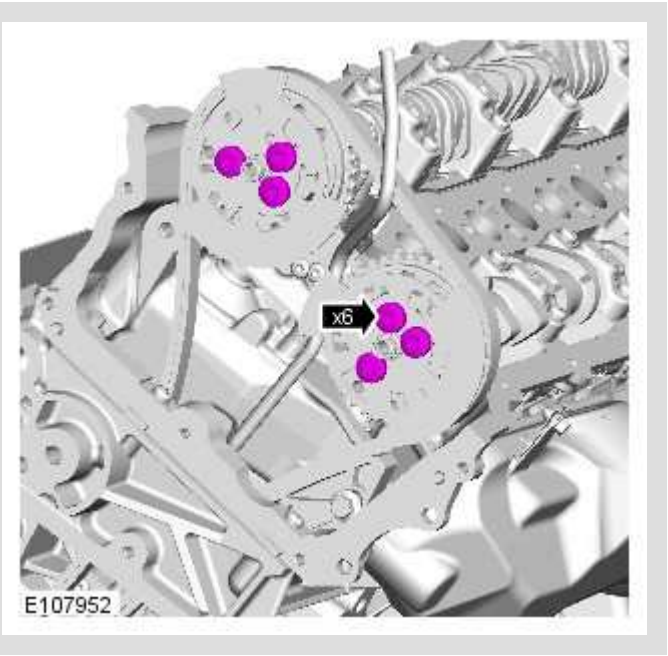
Install the timing chain with the VVT units.

8.

NOTE:

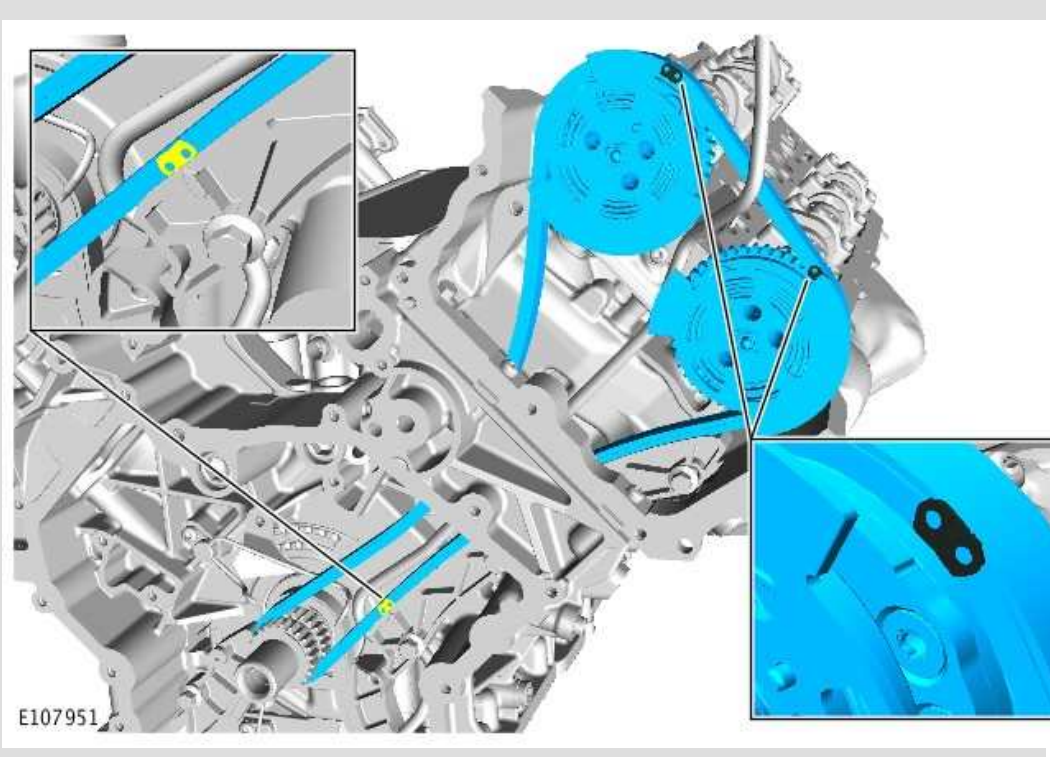
Install the bolts finger tight at this stage.

cardiagn.com



Install the variable valve timing (VVT) unit bolts.

9.



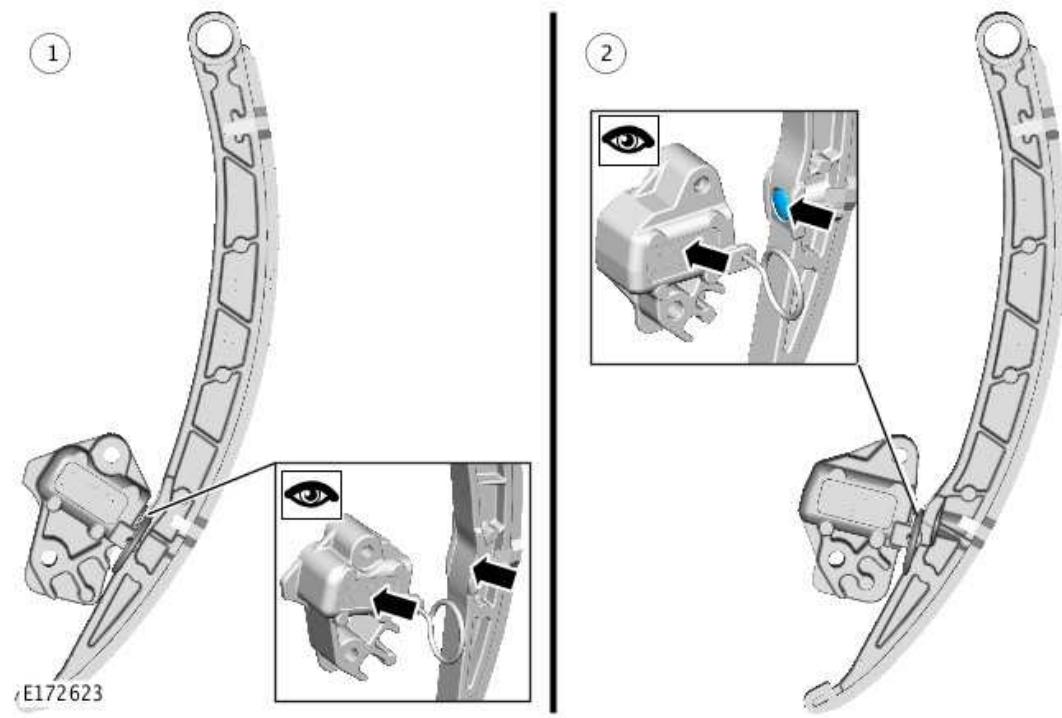
Make sure that all the timing chain alignment marks are in the positions shown.

cardiagn.com

10.

CAUTIONS:

- If the vehicle is fitted with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



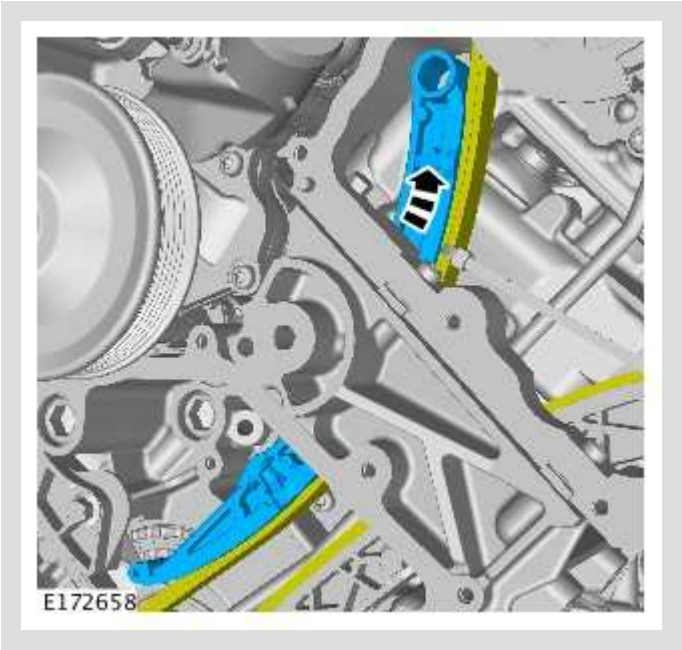
Using the illustration, identify which timing chain tensioner and guide is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only.

11.

CAUTION:

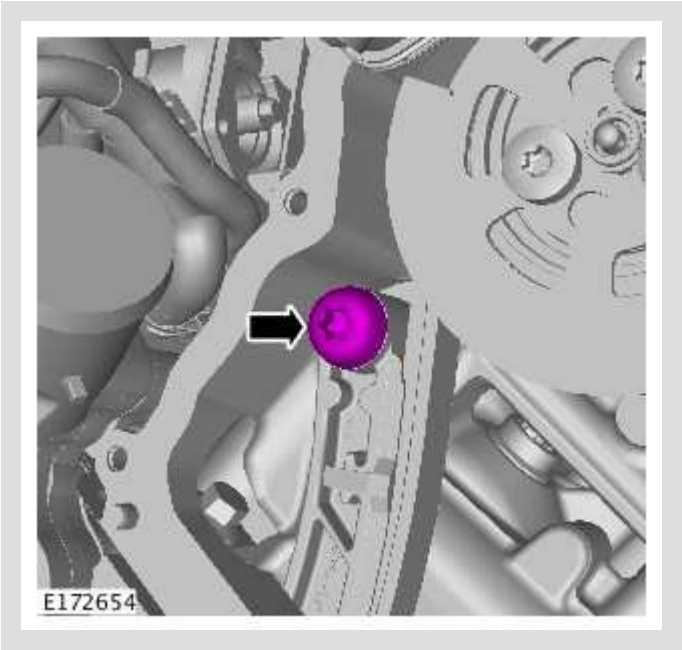
Make sure that a new component is installed.

cardiagn.com



Install the timing chain guide.

12.



Install the timing chain guide bolt.

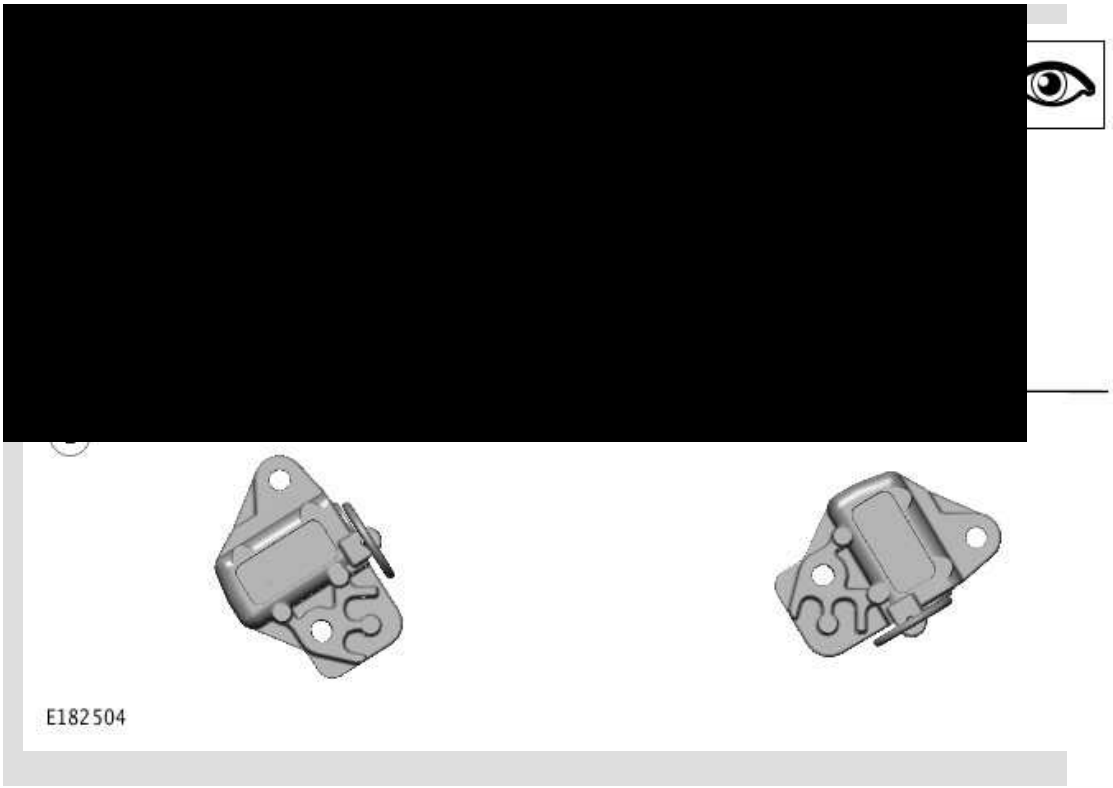
Torque: **25 Nm**

13.

cardiagn.com

CAUTIONS:

- If the vehicle is Installed with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



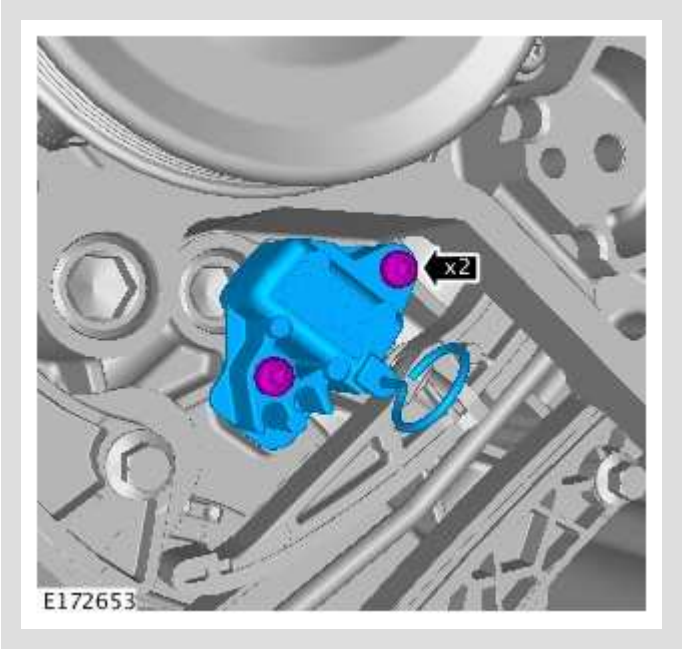
Before installing the timing chain tensioners, use the illustration shown to identify which timing chain tensioner is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only. If a new timing chain tensioner is installed, do not deploy the tensioner pin and proceed to the next step. If the tensioner to be installed has previously been deployed, make sure the attached animation is followed to make sure the tensioner is set correctly, failure to do this may result in damage to the engine.

cardiagn.com

14.

CAUTION:

Do not release the timing chain tensioner locking pin at this stage.

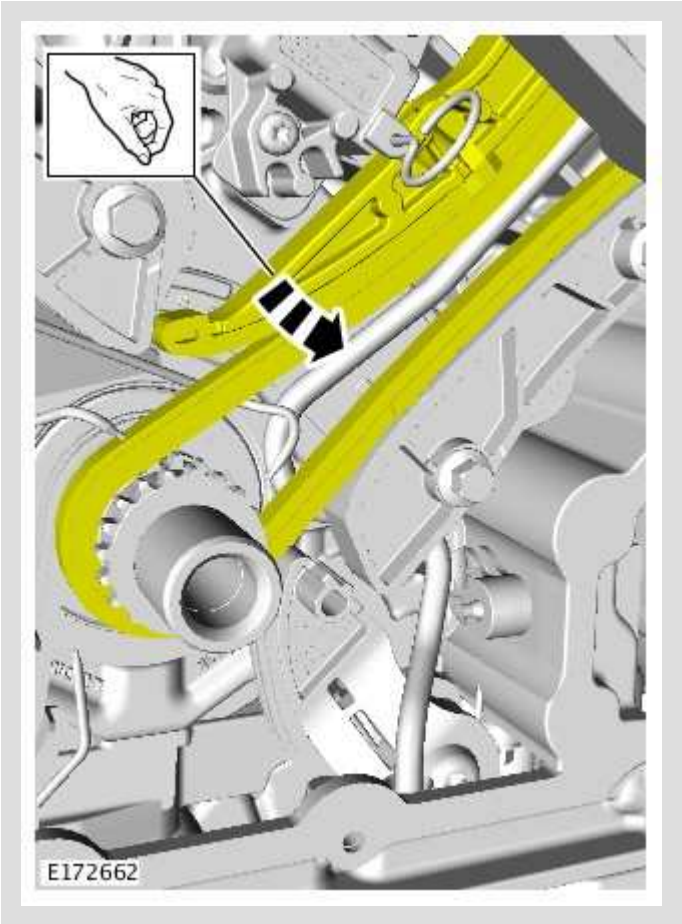


Install the timing chain tensioner.

Torque: **12 Nm**

15.

cardiagn.com

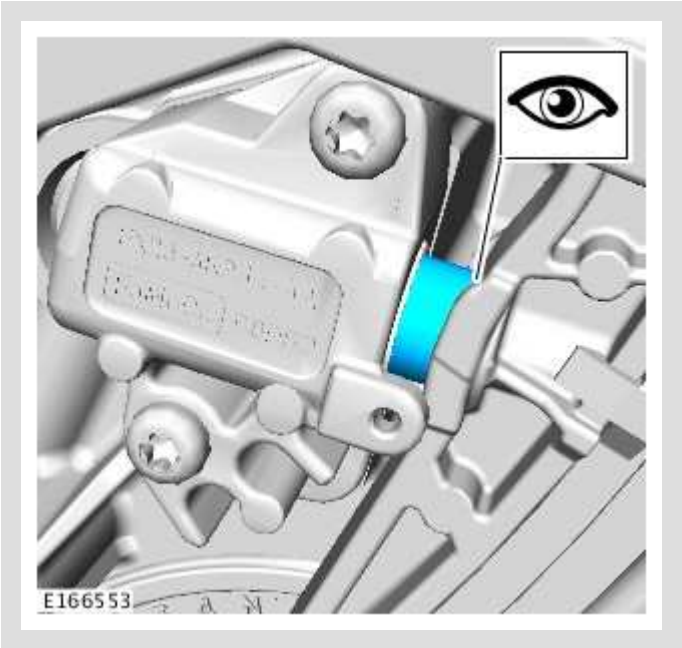


Apply and maintain tension on the component.

cardiagn.com

Remove the timing chain tensioner retaining pin and release the timing chain guide.

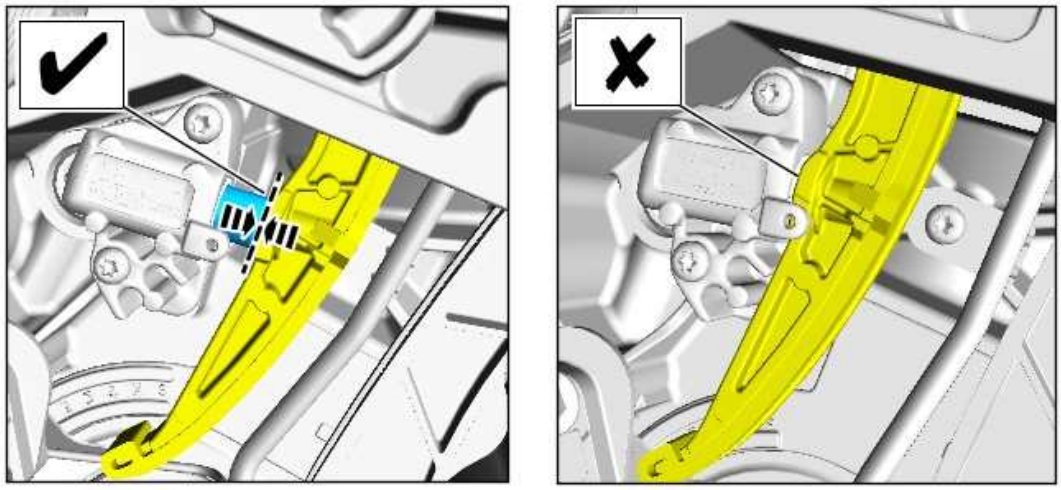
17.



The timing chain tensioner piston should apply tension to the timing chain guide.

18.

cardiagn.com

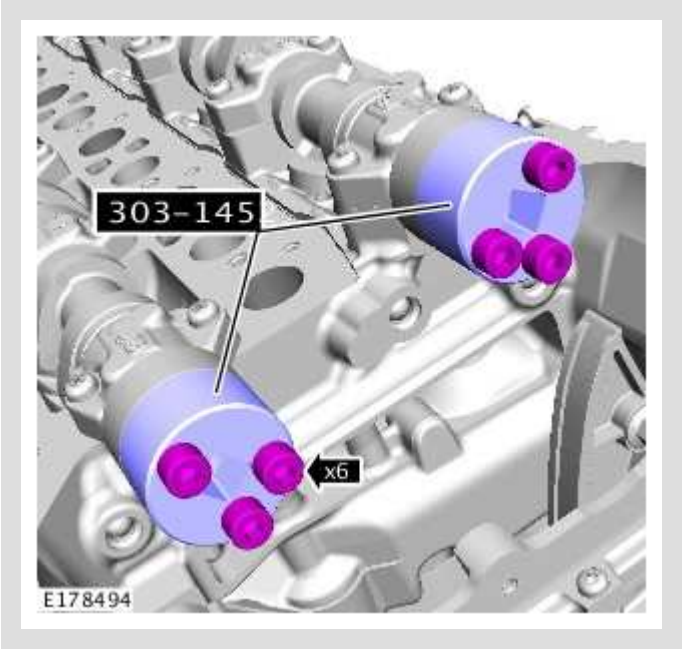


E166556

The timing chain tensioner must maintain tension on the chain guide. If the piston can be pushed back so the chain guide contacts with the body of the tensioner, the tensioner is not correct. Repeat steps 13-18.

19.

cardiagn.com



Install the special tool to each Camshaft.

Special Tool(s): 303-1452

Torque: **10 Nm**

20.

cardiagn.com

CAUTION:

Do not overturn the camshafts.

Carefully rotate the camshafts if the position is not as shown.

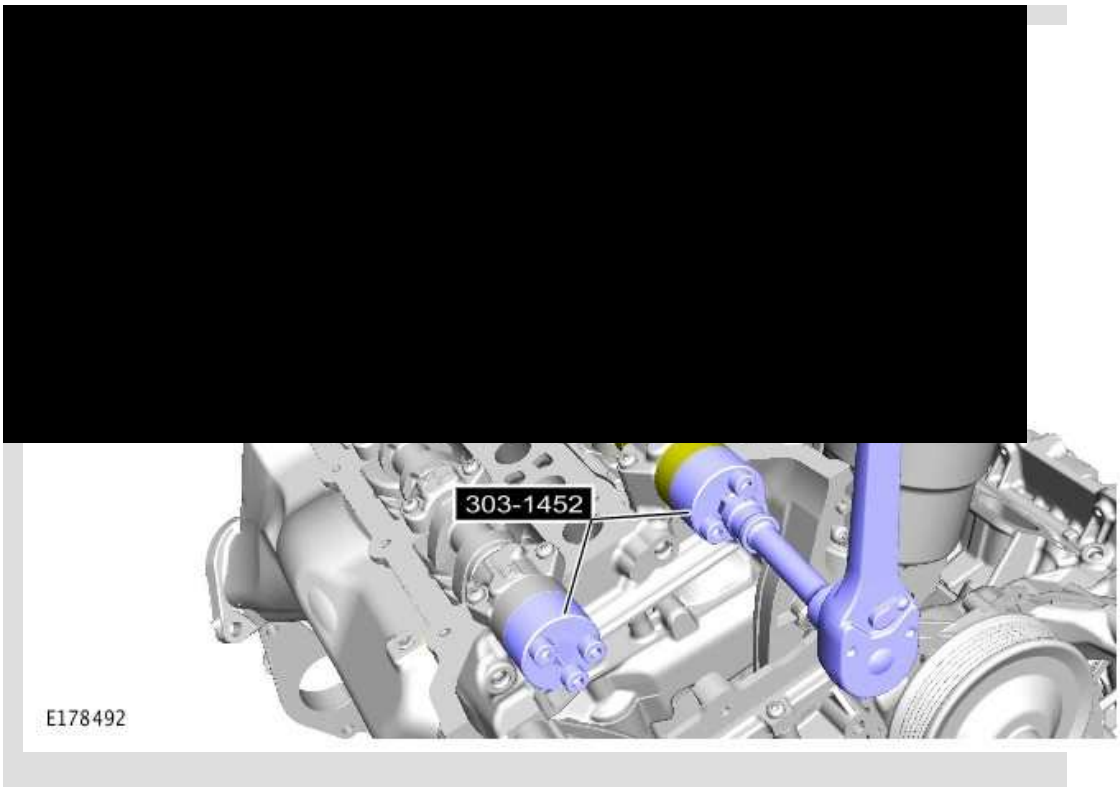
21.

cardiagn.com

CAUTIONS:

Do not overturn the camshafts.

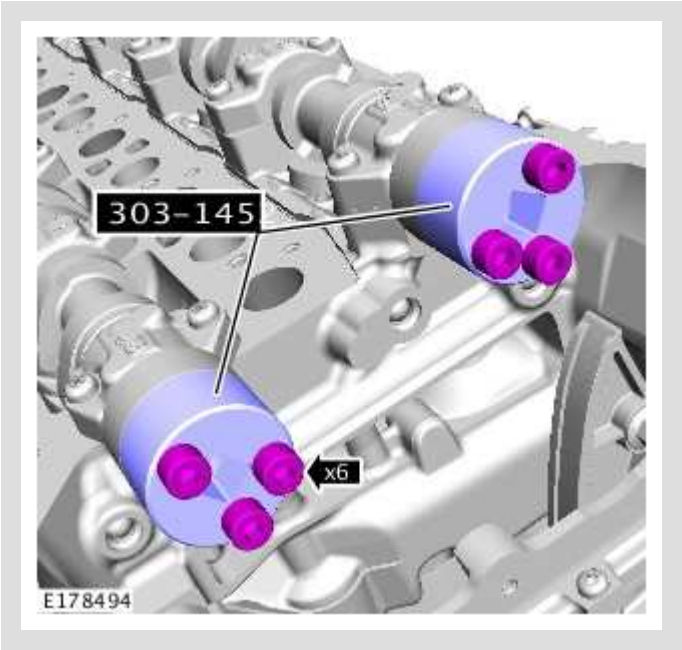
Tighten the wing nuts finger tight. Failure to follow this instruction may result in damage to the components.



Special Tool(s): 303-1452

Using a suitable tool, carefully rock the camshaft clockwise then anti-clockwise. Turn the special tool locking nuts until there is no movement left in camshafts. Repeat this step for both camshafts.

cardiagn.com



Remove the special tool from each Camshaft.

Special Tool(s): 303-1452

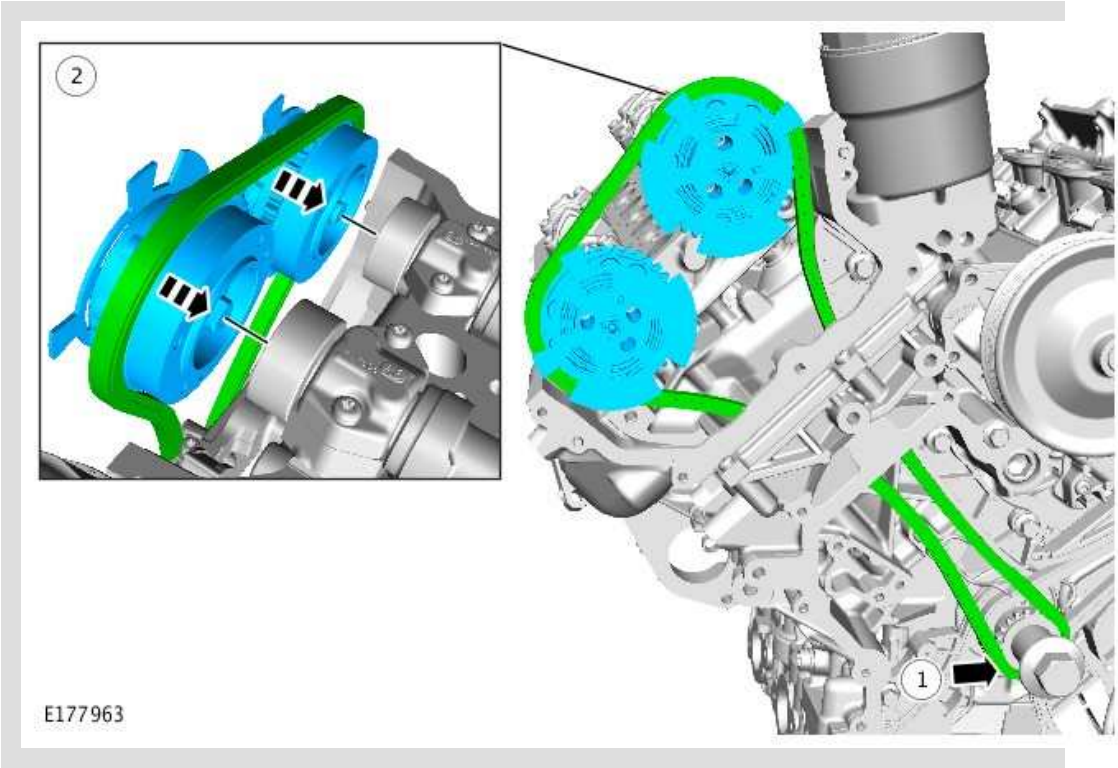
23.

CAUTIONS:

Do not allow the camshafts to rotate.

If the VVT is knocked or dropped then new VVT(s) must be installed.

cardiagn.com



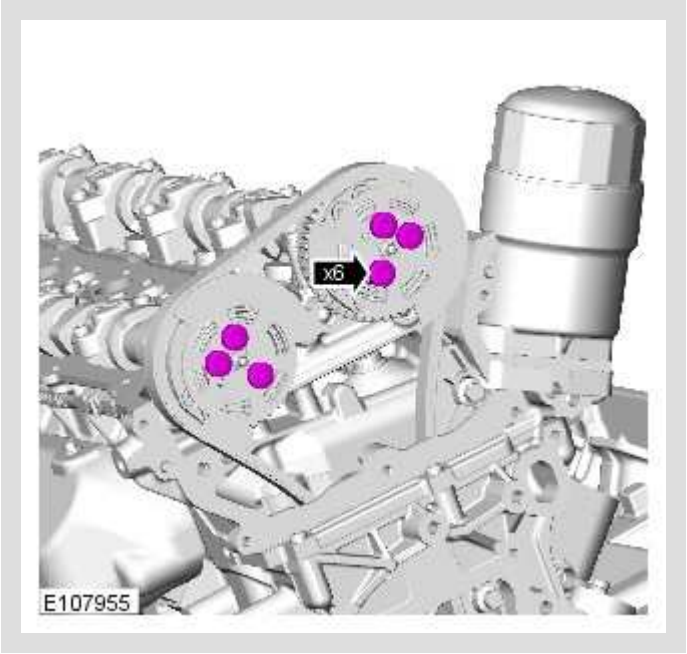
Install the timing chain with the VVT units.

24.

NOTE:

Install the bolts finger tight at this stage.

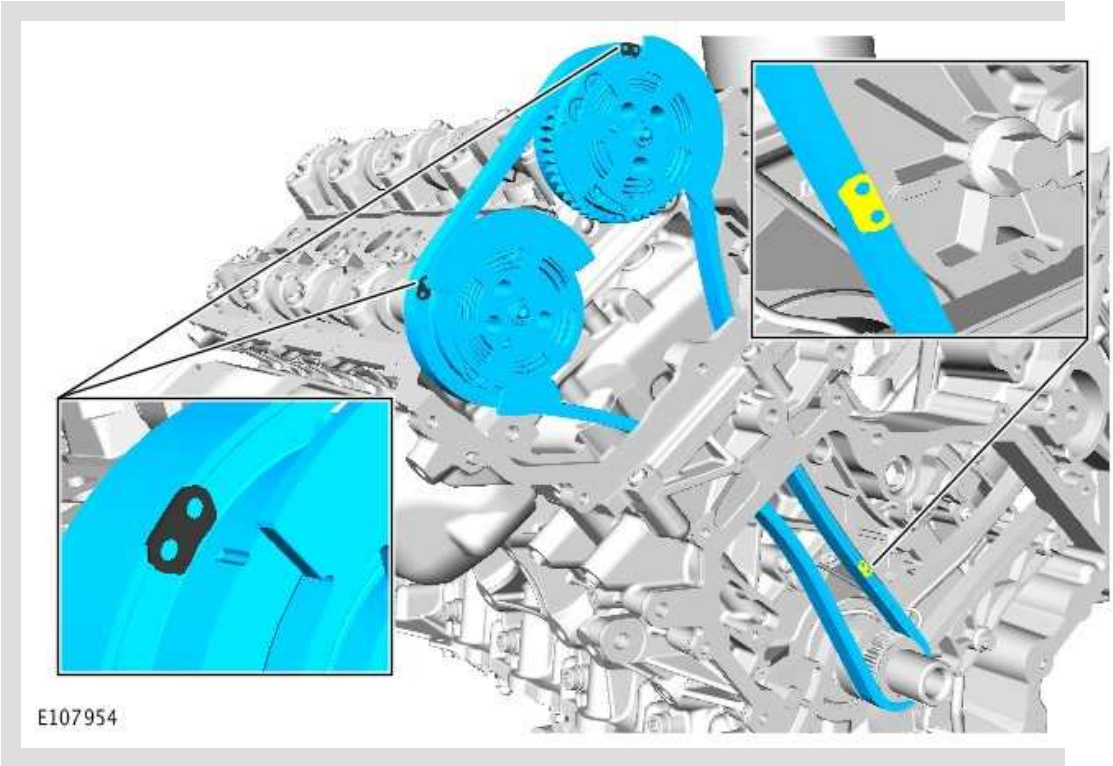
cardiagn.com



Install the variable valve timing (VVT) unit bolts.

25.

cardiagn.com

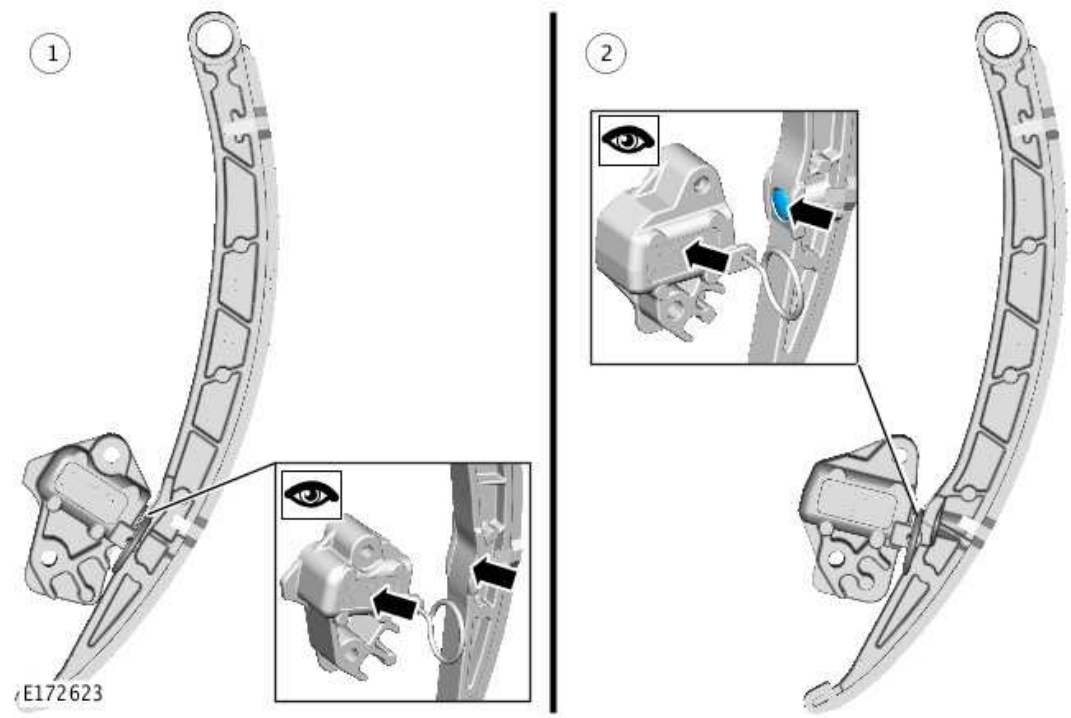


Make sure that all the timing chain alignment marks are in the positions shown.

cardiagn.com

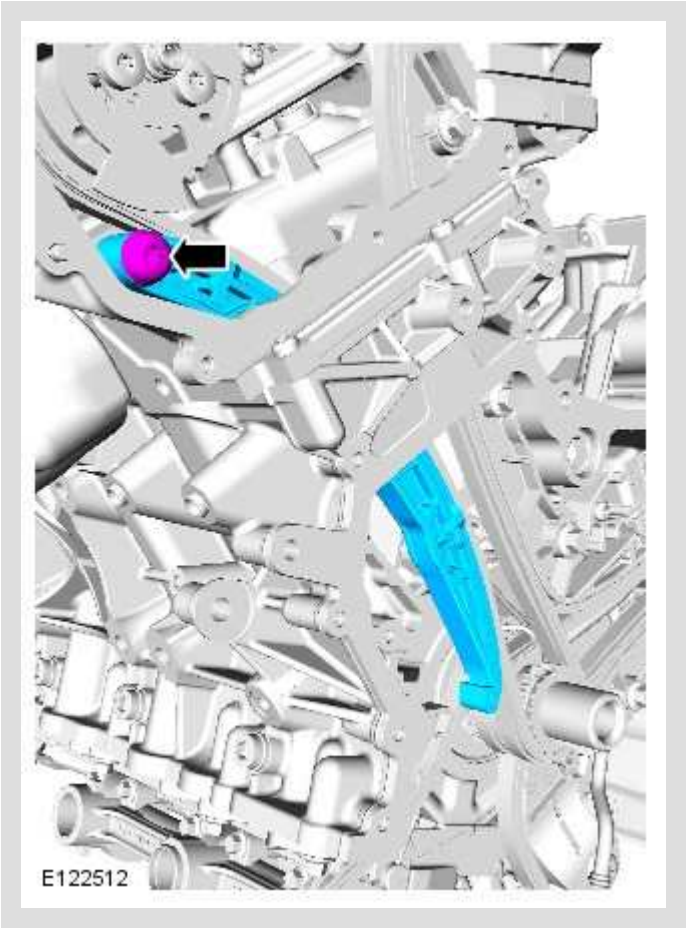
CAUTIONS:

- If the vehicle is fitted with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



Using the illustration, identify which timing chain tensioner and guide is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only.

cardiagn.com



Install the timing chain guide.

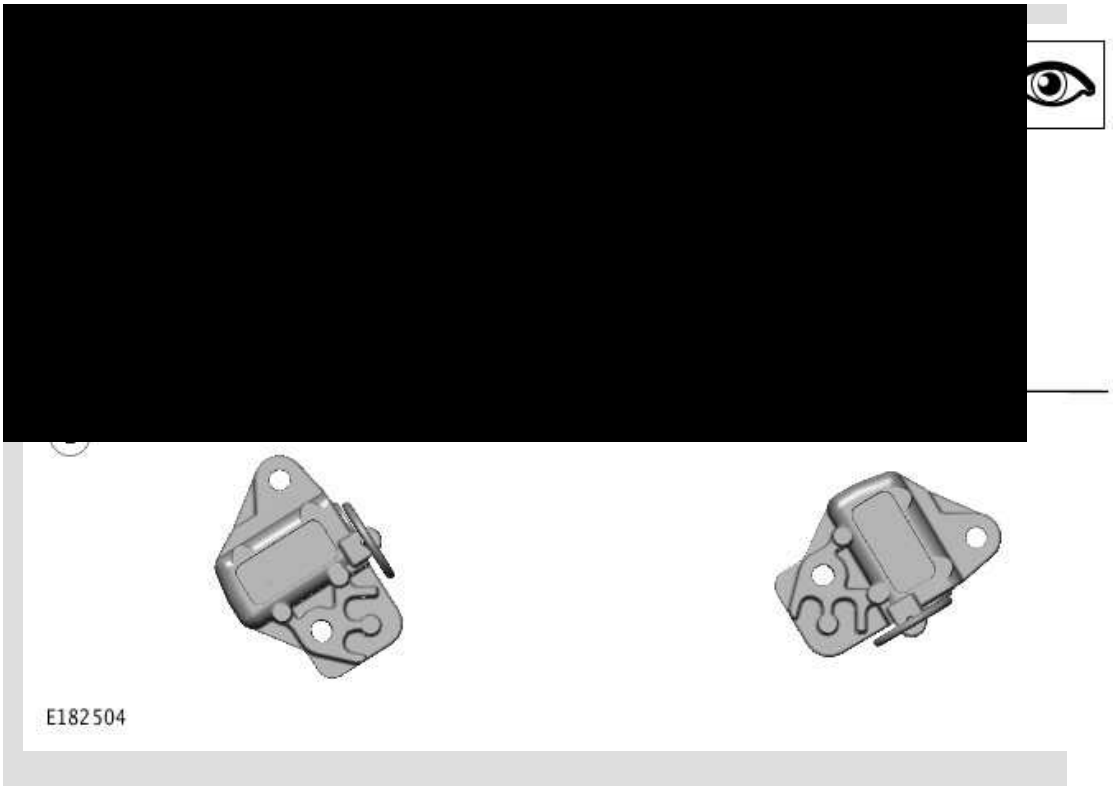
Torque: **25 Nm**

28.

cardiagn.com

CAUTIONS:

- If the vehicle is Installed with components shown in section 1 of the illustration, these must be replaced with components shown in section (2).
- Do not attempt to install the components shown in section 1 of the illustration, as damage to the engine may occur.



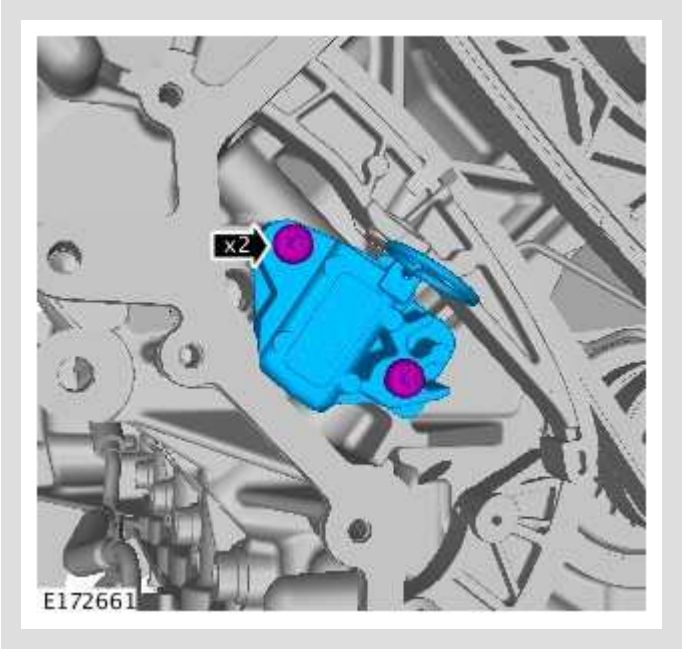
Before installing the timing chain tensioners, use the illustration shown to identify which timing chain tensioner is currently fitted to the vehicle. Make sure the vehicle is assembled using components shown in section (2) of the illustration only. If a new timing chain tensioner is installed, do not deploy the tensioner pin and proceed to the next step. If the tensioner to be installed has previously been deployed, make sure the attached animation is followed to make sure the tensioner is set correctly, failure to do this may result in damage to the engine.

cardiagn.com

29.

CAUTION:

Do not release the timing chain tensioner locking pin at this stage.

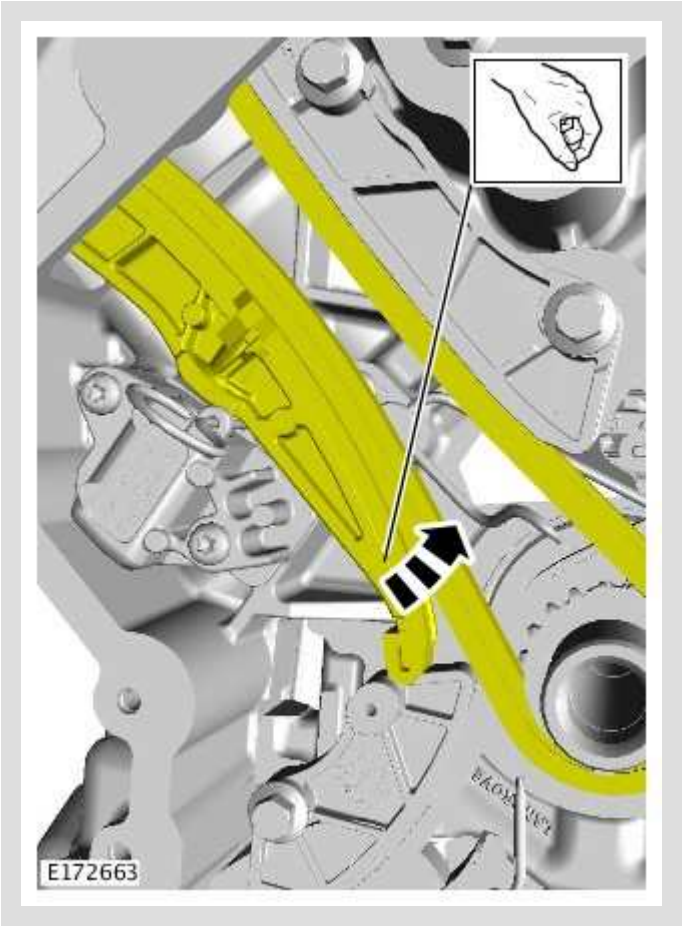


Before installing the timing chain tensioners, make sure the attached animation is followed to ensure the tensioner is set correctly, failure to do this may result in damage to the engine.

Torque: **12 Nm**

30.

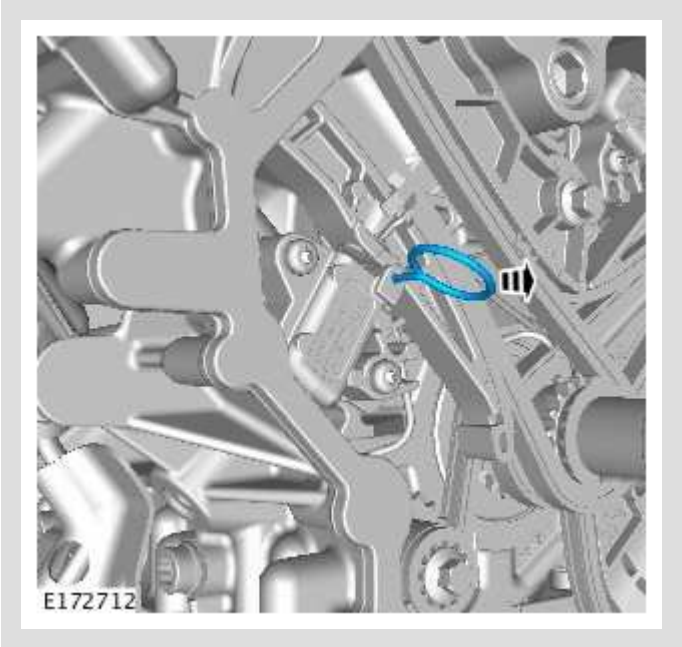
cardiagn.com



Apply and maintain tension on the component.

31.

cardiagn.com



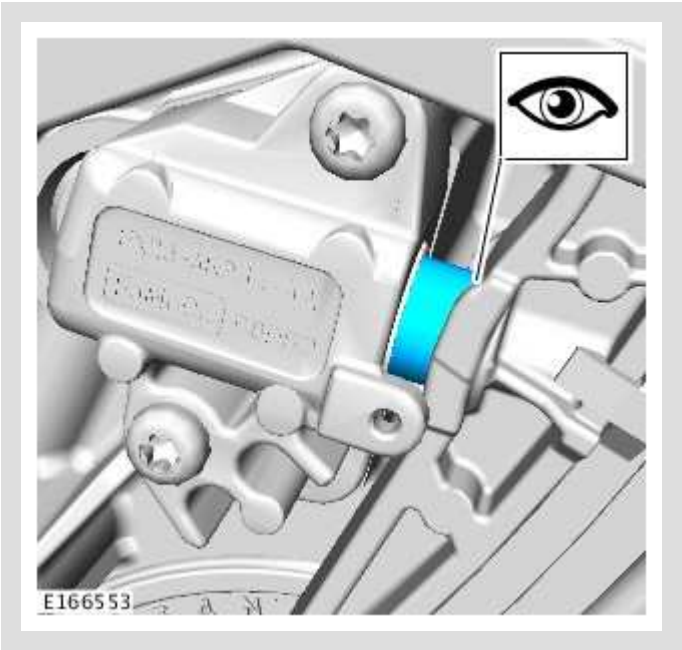
Remove the timing chain tensioner retaining pin and release the timing chain guide.

32.

NOTE:

Left hand illustration shown, Right hand is similar.

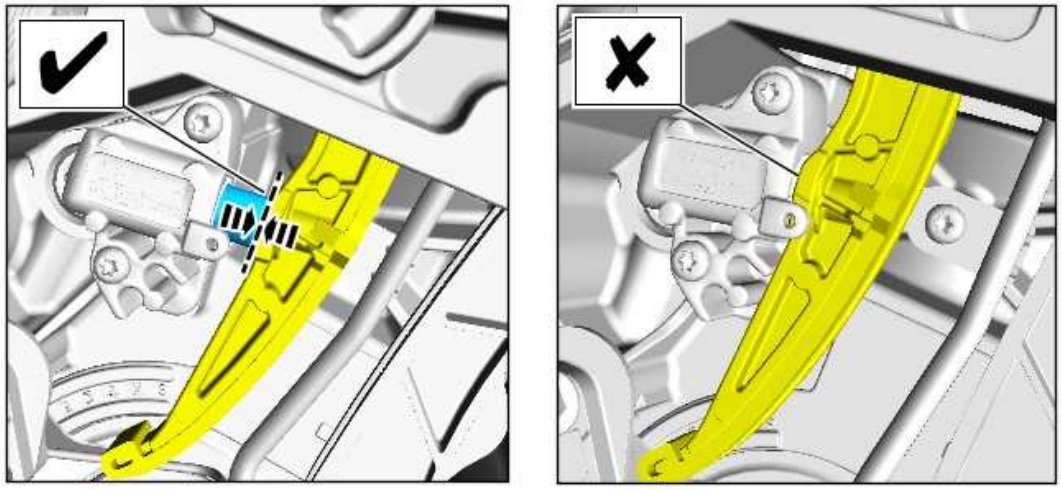
cardiagn.com



The piston should apply tension to the timing chain guide.

33.

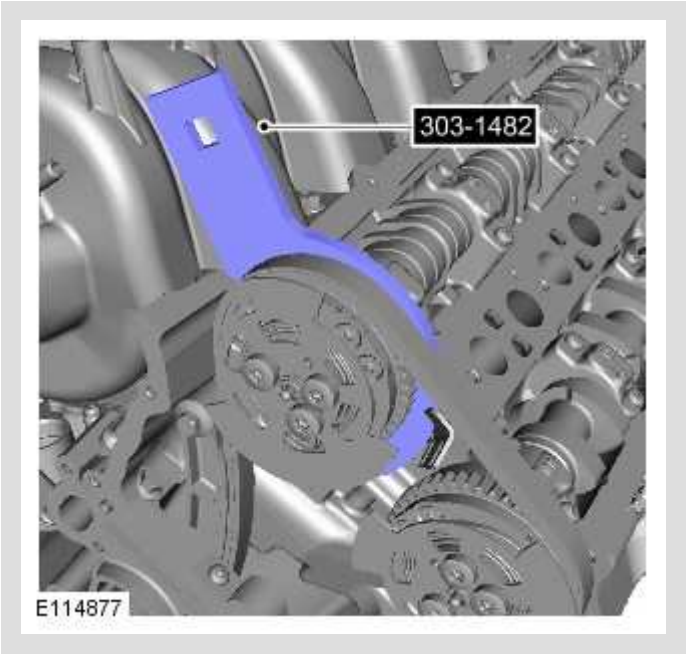
cardiagn.com



E166556

The timing chain tensioner must maintain tension on the chain guide. If the piston can be pushed back so the chain guide contacts with the body of the tensioner, the tensioner is not correct. Repeat steps 28-33.

cardiagn.com



Install the special tool.

Special Tool(s): 303-1482

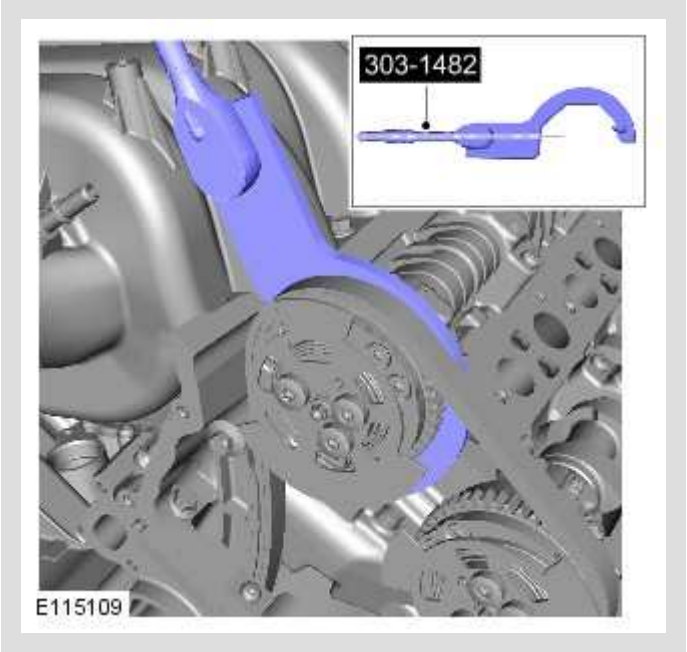
35.

CAUTIONS:

Apply the torque to the end of the special tool.

Make sure that the torque wrench is aligned with the special tool as illustrated in the graphic.

cardiagn.com



Install the torque wrench to the special tool.

Torque: **35 Nm**

36.

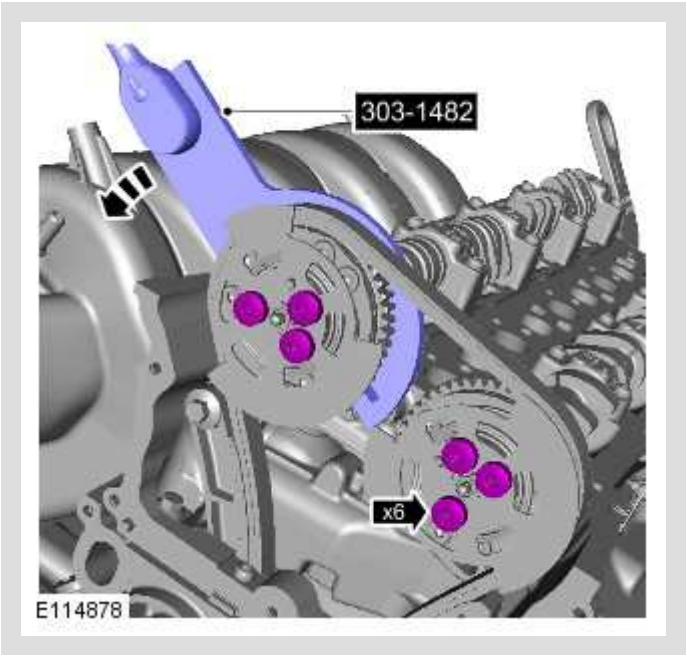
CAUTION:

Make sure that the torque wrench does not move whilst tightening the VVT bolts.

NOTE:

Make sure to tighten the exhaust VVT unit bolts first.

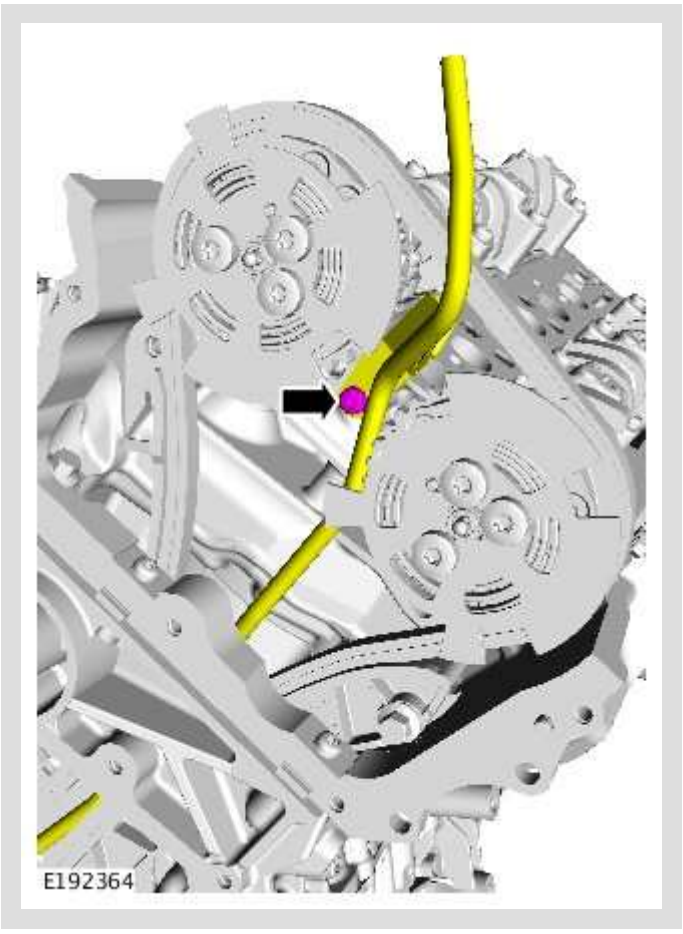
cardiagn.com



1. *Torque:* **32 Nm**

1. *Special Tool(s):* 303-1482

37.

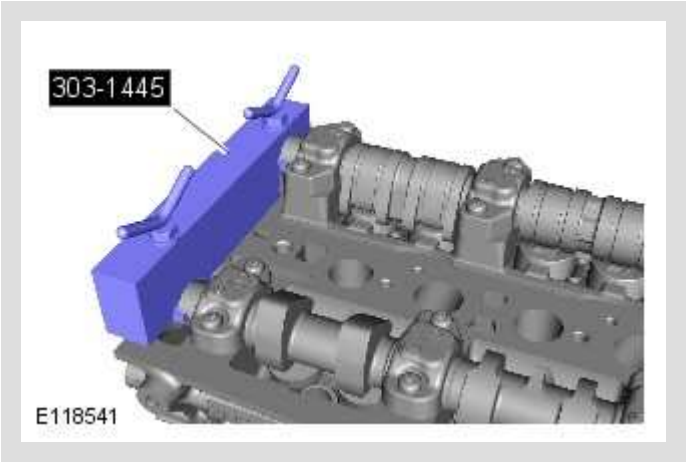


Install the oil drain tube.

cardiagn.com

Torque: **10 Nm**

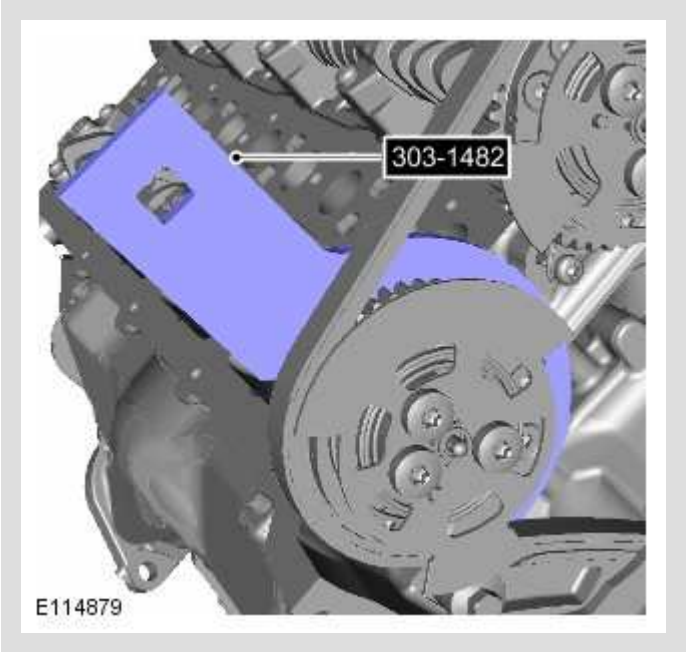
38.



Remove the special tool.

Special Tool(s): 303-1445

39.



Install the special tool.

Special Tool(s): 303-1482

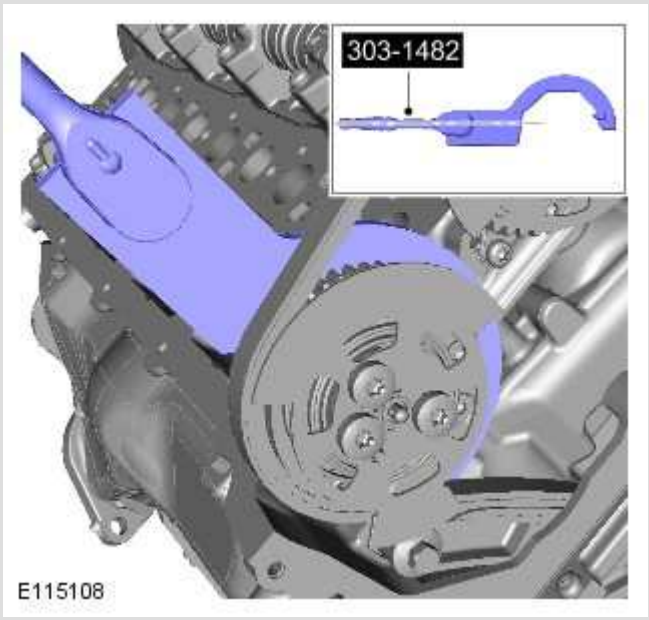
40.

cardiagn.com

CAUTIONS:

Apply the torque to the end of the special tool.

Make sure that the torque wrench is aligned with the special tool as illustrated in the graphic.



Install the torque wrench to the special tool.

Torque: **35 Nm**

41.

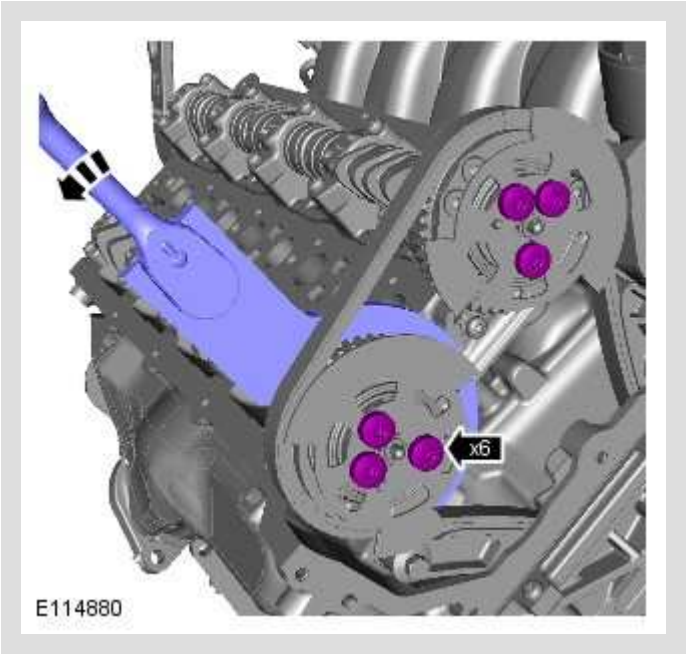
CAUTION:

Make sure that the torque wrench does not move whilst tightening the VVT bolts.

NOTE:

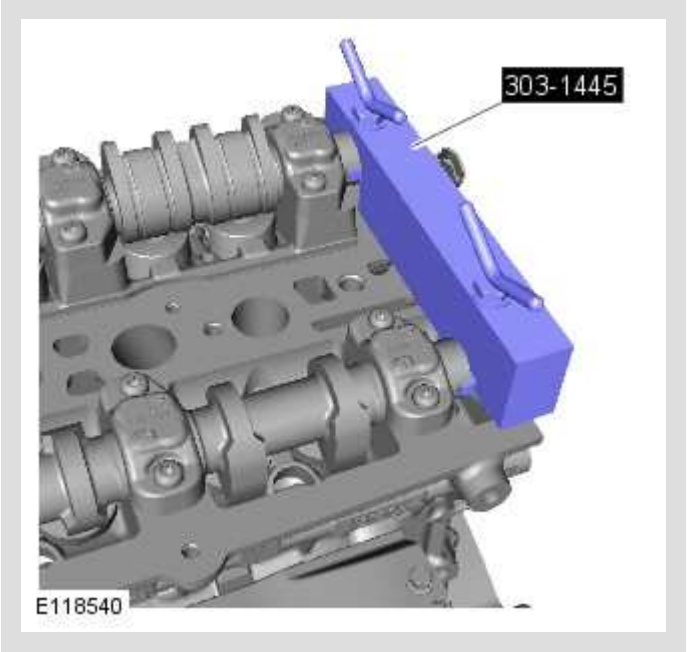
Make sure to tighten the inlet VVT unit bolts first.

cardiagn.com



Torque: **32 Nm**

42.

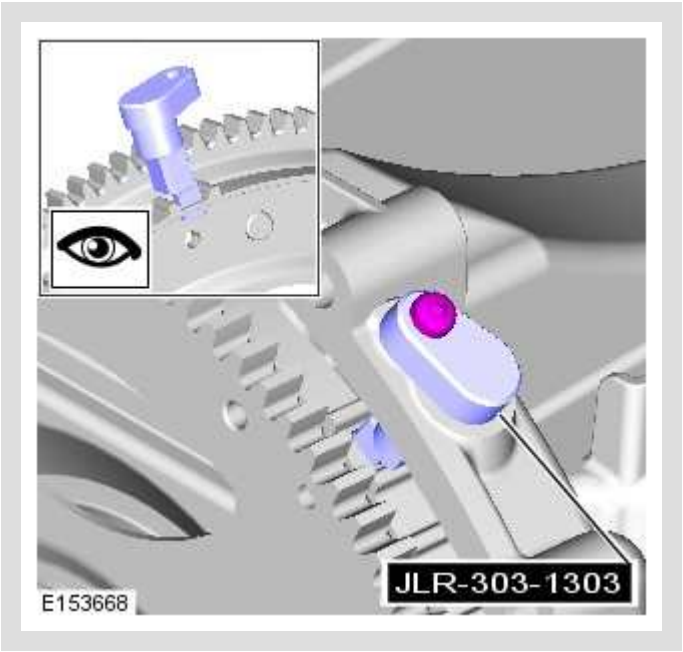


Remove the special tool.

Special Tool(s): 303-1445

43.

cardiagn.com



Remove the special tool.

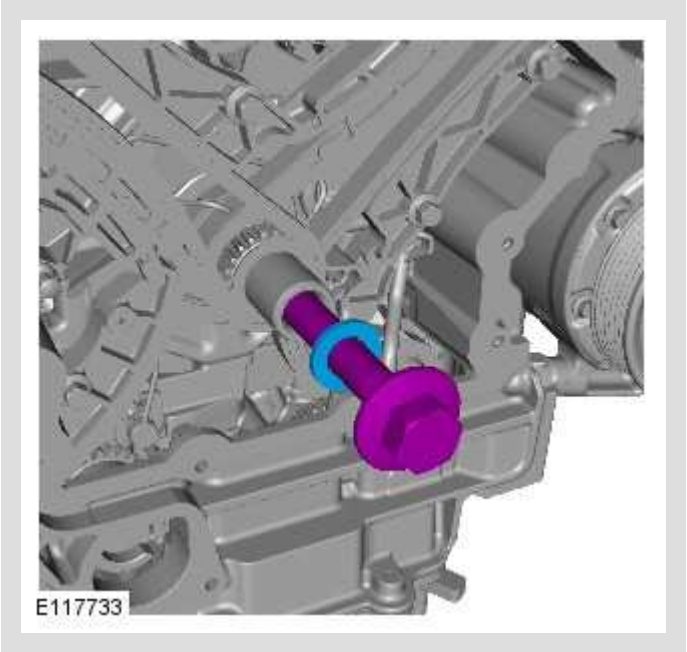
Special Tool(s): JLR-303-1303

44.

CAUTION:

An M16 washer must be used to prevent damage to the crankshaft on installation.

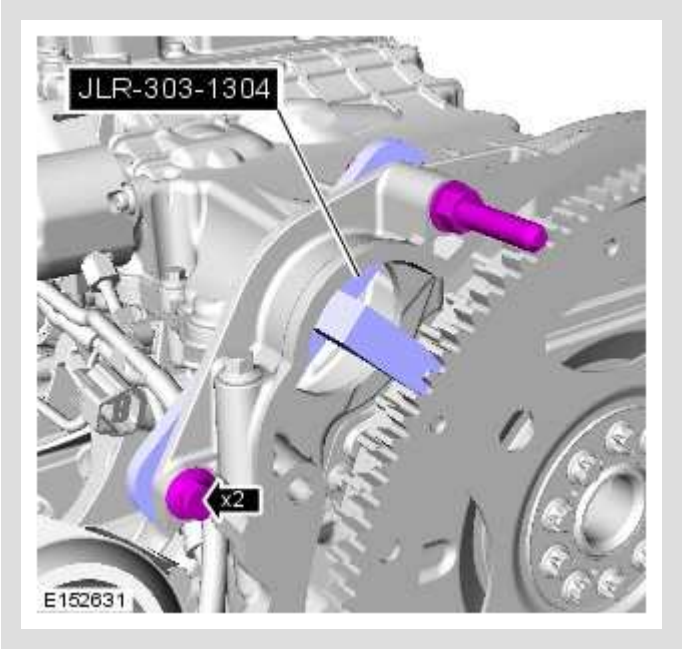
cardiagn.com



Install the crankshaft pulley bolt.

Torque: **20 Nm**

45.



Remove the special tool.

Special Tool(s): JLR-303-1304

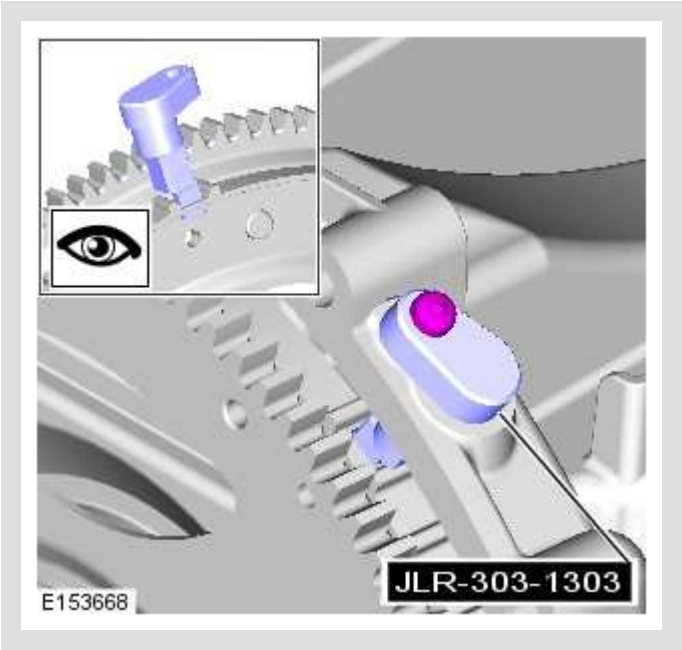
46. Rotate the engine two complete turns clockwise.

47.

CAUTION:

cardiagn.com

Only rotate the crankshaft clockwise.



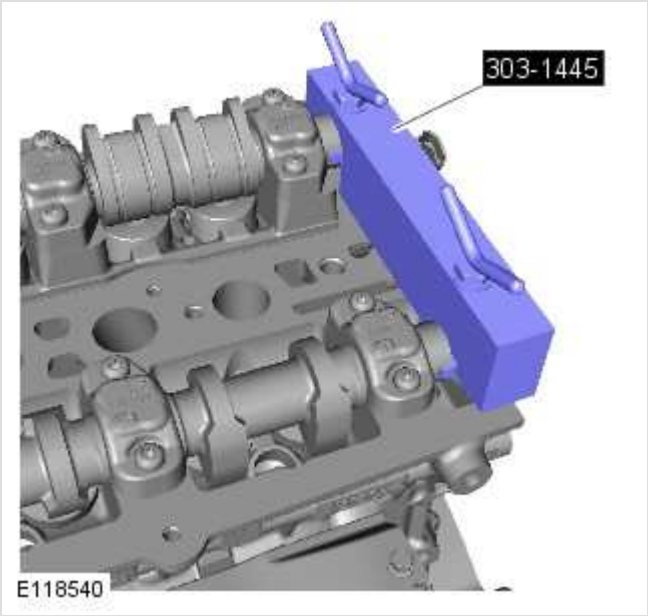
Install the special tool.
Special Tool(s): JLR-303-1303

48.

CAUTION:

If the special tool cannot be installed, the timing chain installation steps must be repeated.

cardiagn.com

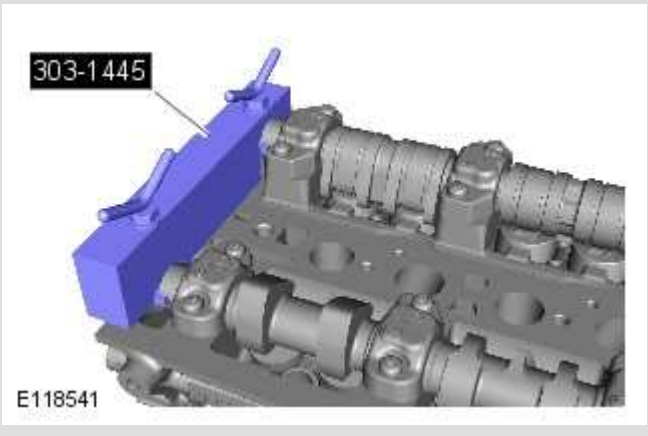


Install the special tool. If the special tool cannot be installed, remove both timing chains and components and repeat the process from step 3 of the installation until the special tool 303-1445 is installed correctly.
Special Tool(s): 303-1445

49.

CAUTION:

If the special tool cannot be installed, the timing chain installation steps must be repeated.

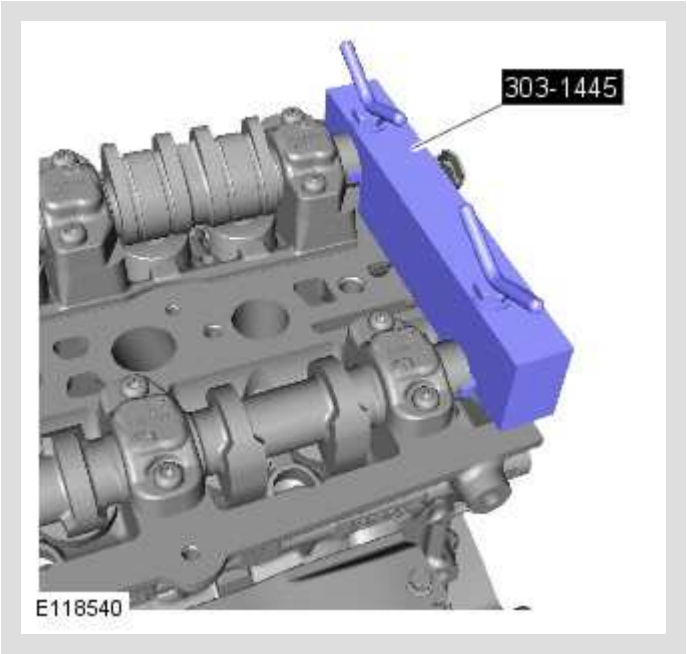


Install the special tool. If the special tool cannot be installed,

cardiagn.com

remove both timing chains and components and repeat the process from step 3 of the installation until the special tool 303-1445 is installed correctly.

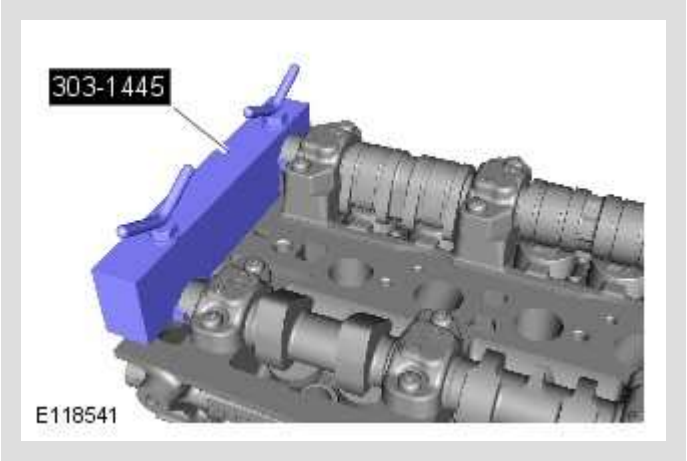
50.



Remove the special tool.

Special Tool(s): 303-1445

51.

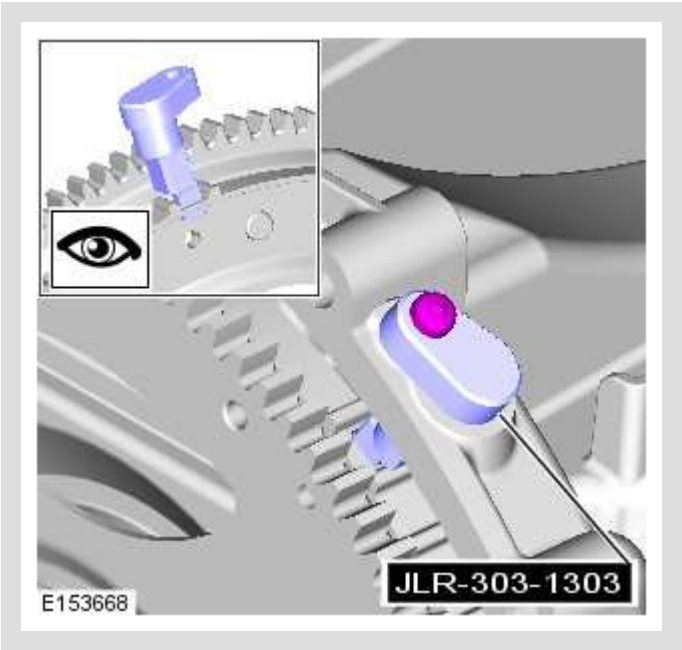


Remove the special tool.

Special Tool(s): 303-1445

52.

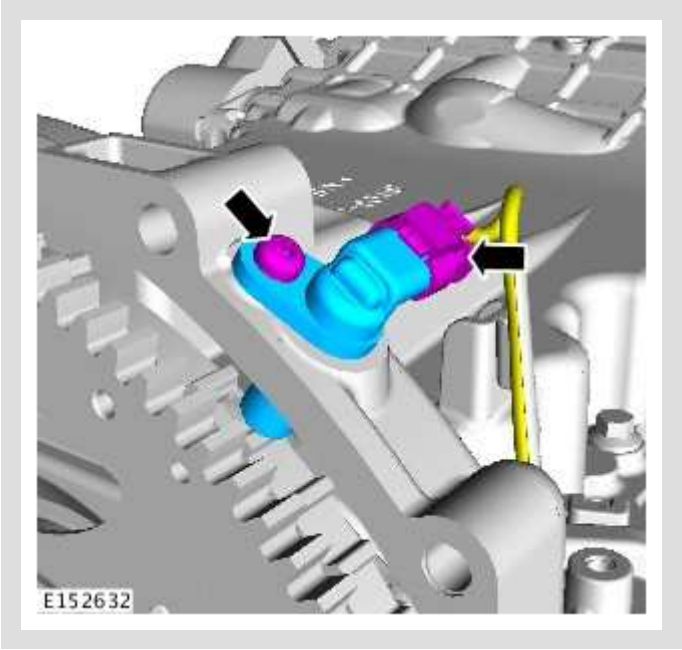
cardiagn.com



Remove the special tool.

Special Tool(s): JLR-303-1303

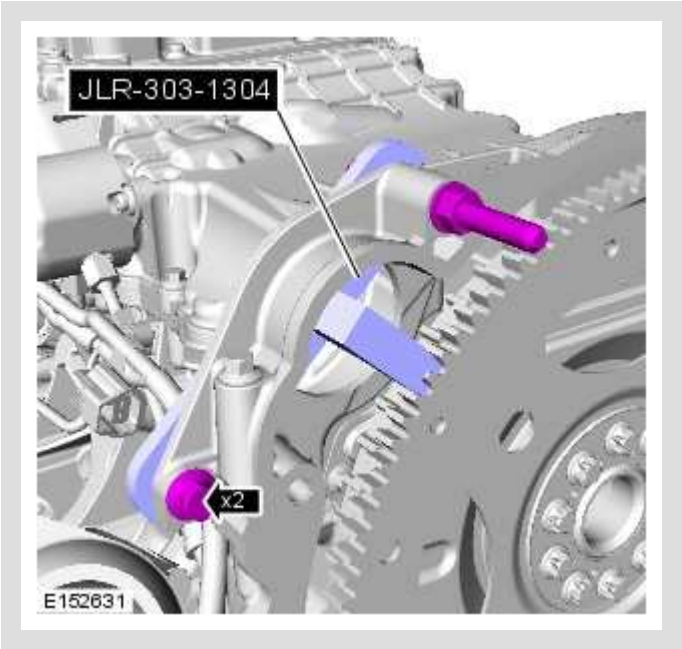
53.



Torque: **10 Nm**

54.

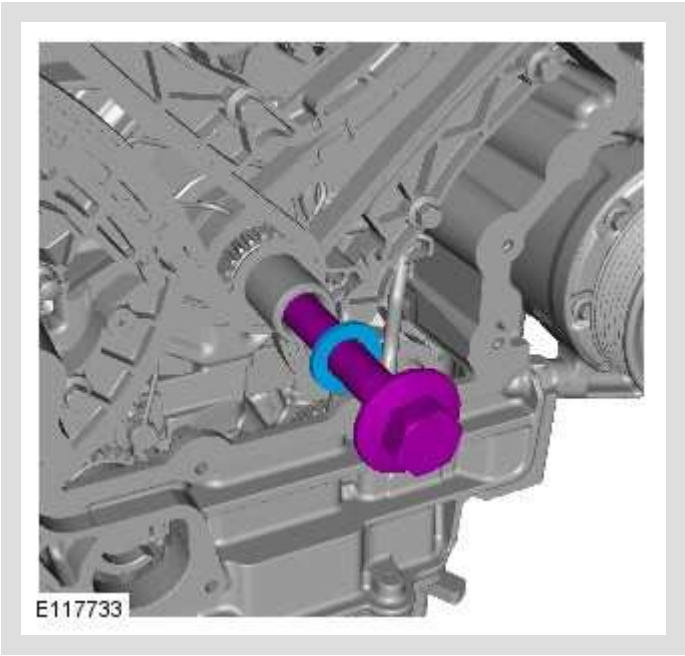
cardiagn.com



Install the special tool.

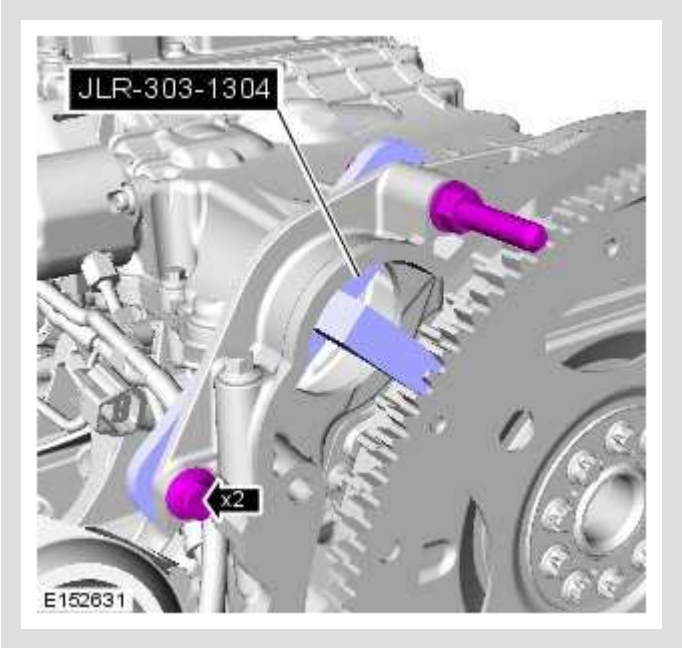
Special Tool(s): JLR-303-1304

55.



56.

cardiagn.com



Remove the special tool.
Special Tool(s): JLR-303-1304

57. Install the timing cover.
Refer to: Timing Cover (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

58. Install the starter motor
Refer to: Starter Motor (303-06A, Removal and Installation).
Refer to: Starter Motor (303-06B, Removal and Installation).

59. Connect the battery ground cable.
Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

TIMING COVER (G1780495)

REMOVAL AND INSTALLATION

SPECIAL TOOL(S)

E107676	**303-1433** Lower Timing Cover Alignment tool

REMOVAL

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

All vehicles

cardiagn.com

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

Vehicles with 3.0L SC engine

1. Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Accessory Drive Belt Tensioner (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Thermostat Housing (303-03A Engine Cooling - V6 S /C 3.0L Petrol, Removal and Installation).
   Refer to: Electric Thermostat (303-03A Engine Cooling - V6 S /C 3.0L Petrol, Removal and Installation).

2. **NOTE:**

   Both components must be removed.

   Refer to: Valve Cover LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Valve Cover RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

Vehicles with 5.0L SC engine

1. Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

cardiagn.com

Refer to: Accessory Drive Belt Tensioner (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
Refer to: Thermostat Housing (303-03A Engine Cooling - V6 S/C 3.0L Petrol, Removal and Installation).

2. **NOTE:**

   Both components must be removed.

   Refer to: Valve Cover LH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).
   Refer to: Valve Cover RH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

All vehicles

1. Refer to: Crankshaft Pulley (303-01A, Removal and Installation).
   Refer to: Crankshaft Pulley (303-01B, Removal and Installation).

2. Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

Vehicles with hydraulic power steering

1.

cardiagn.com

	Vehicles with electric power steering

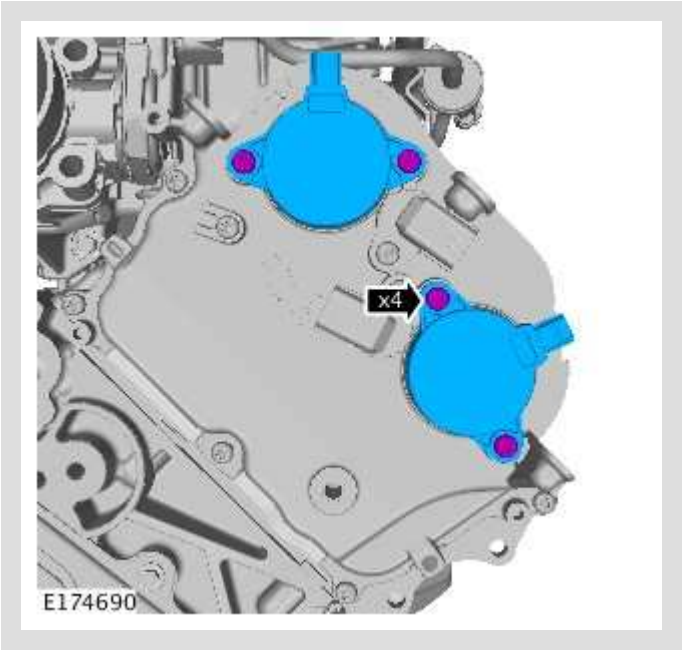
1.

cardiagn.com

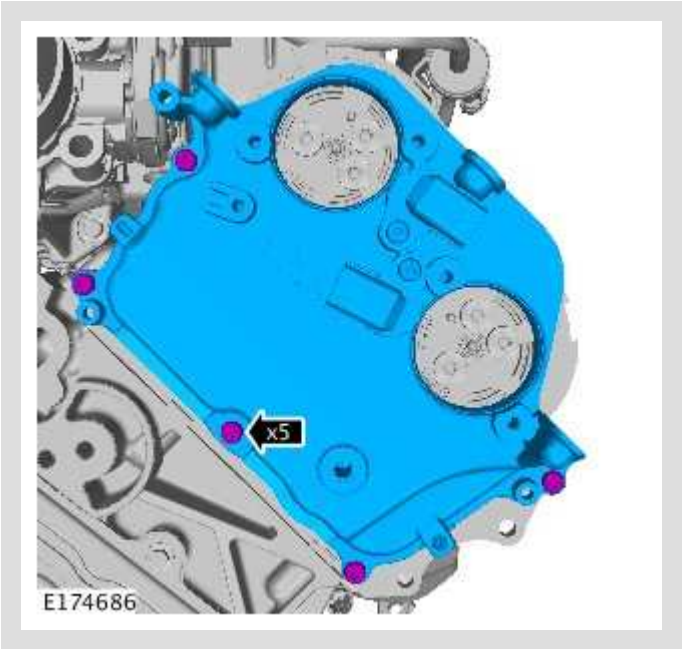
All vehicles

1.

cardiagn.com

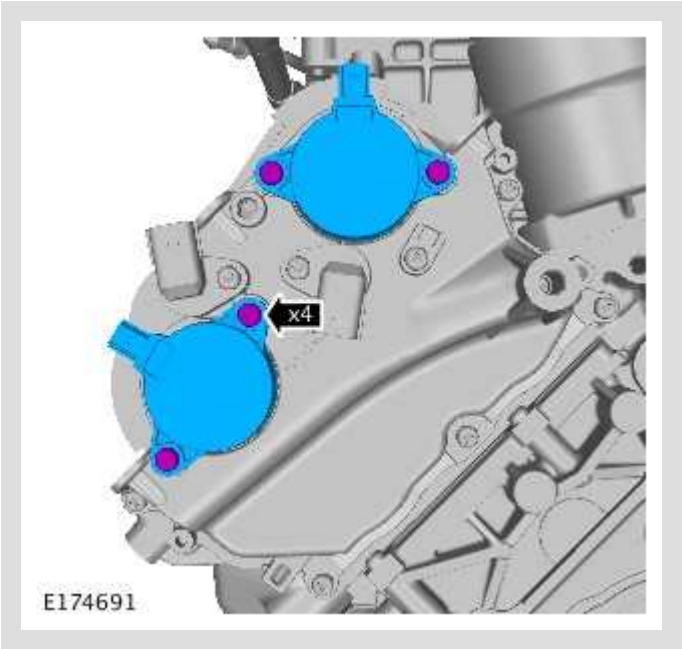


2.

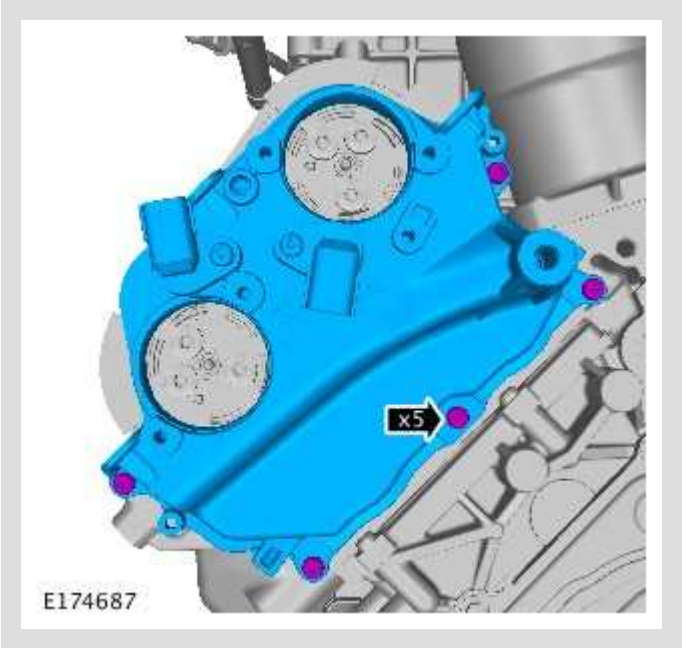


cardiagn.com

3.



4.



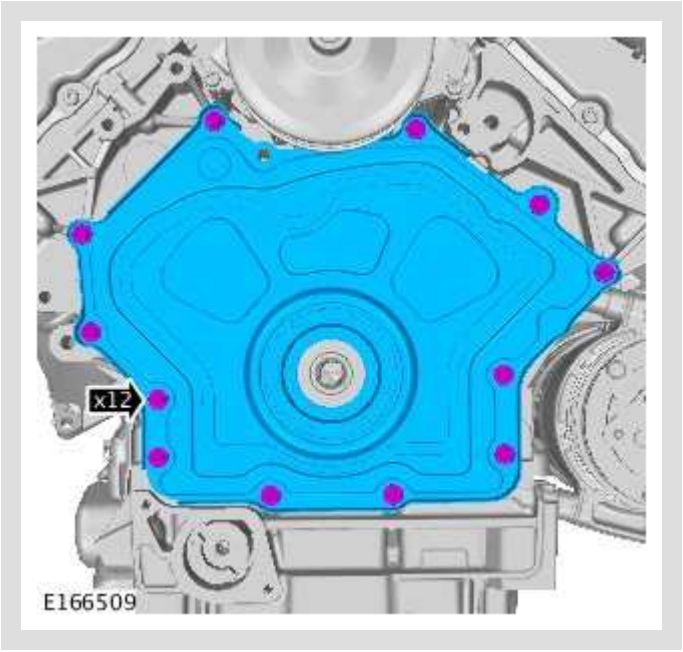
5. Refer to: Crankshaft Pulley (303-01 Engine - V8 S/C 5.0L Petrol, Removal and Installation).

6. Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

7. **CAUTION:**

cardiagn.com

Discard the component.



INSTALLATION

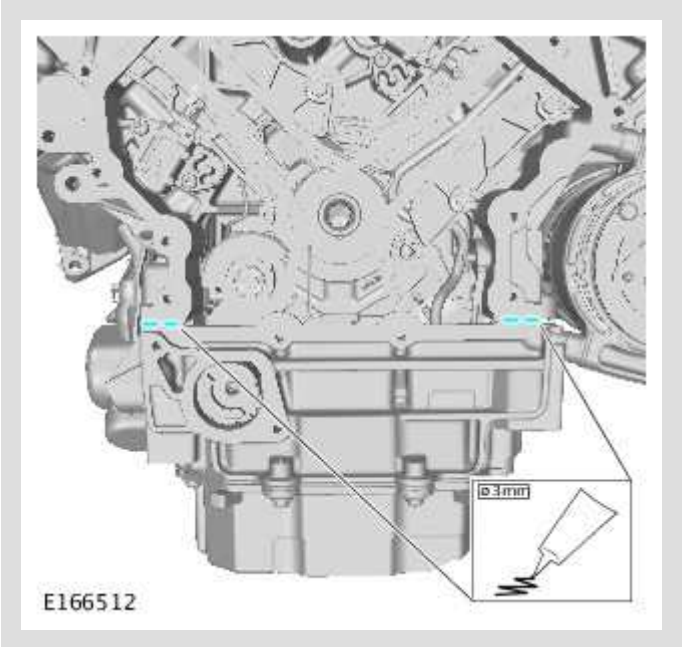
All vehicles

1.

CAUTIONS:

- Use only a plastic scraper when removing the sealing material.
- Make sure that the mating faces are clean and free of foreign material.
- Make sure that the Land Rover approved cleaning fluid (Loctite 7063) is used to clean the mating faces.

cardiagn.com



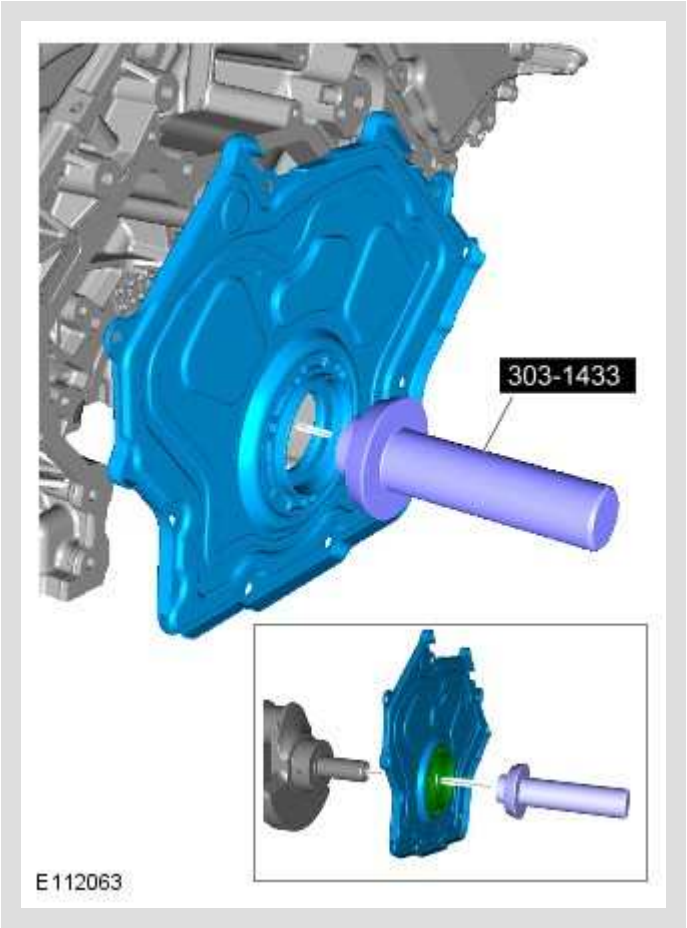
Apply RTV sealant (Loctite 5901G) to the areas shown.

2.

CAUTION:

Make sure that the mating faces are clean and free of foreign material.

cardiagn.com



Install the bolts, but do not tighten fully at this stage.

Special Tool(s): 303-1433

3.

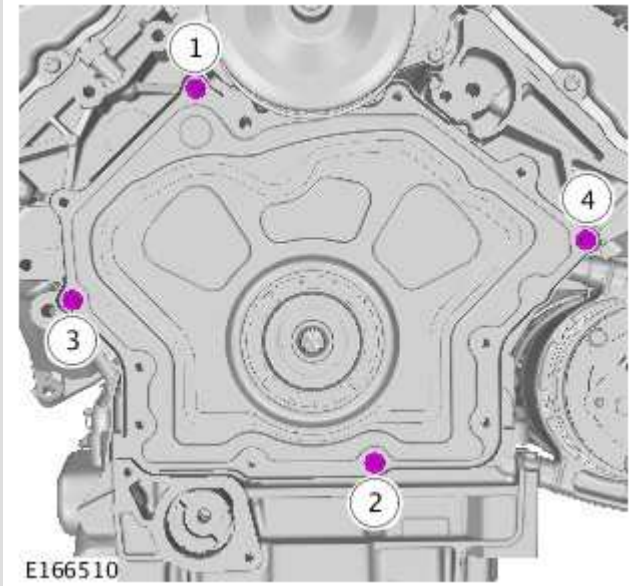
CAUTION:

Make sure that a new component is installed.

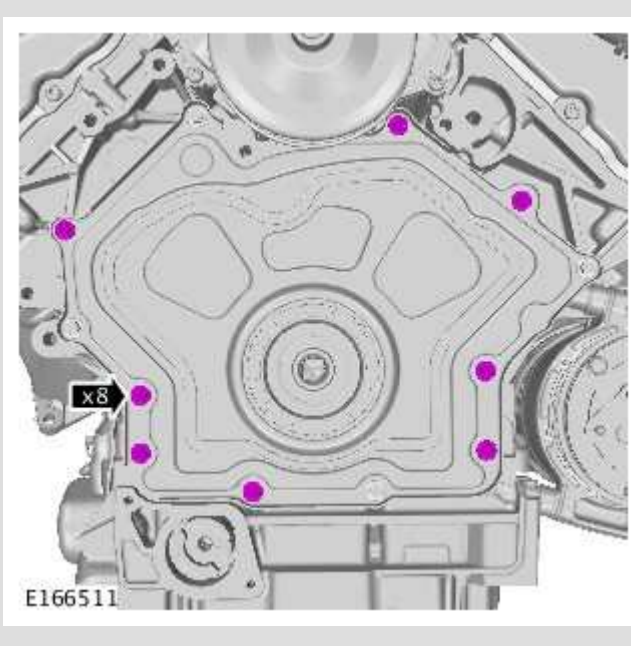
cardiagn.com

NOTES:

- Tighten the bolts in the indicated sequence.
- Special tools shown removed for clarity.



Torque: **12 Nm**

4. 

Torque: **12 Nm**

5. Remove the special tools.

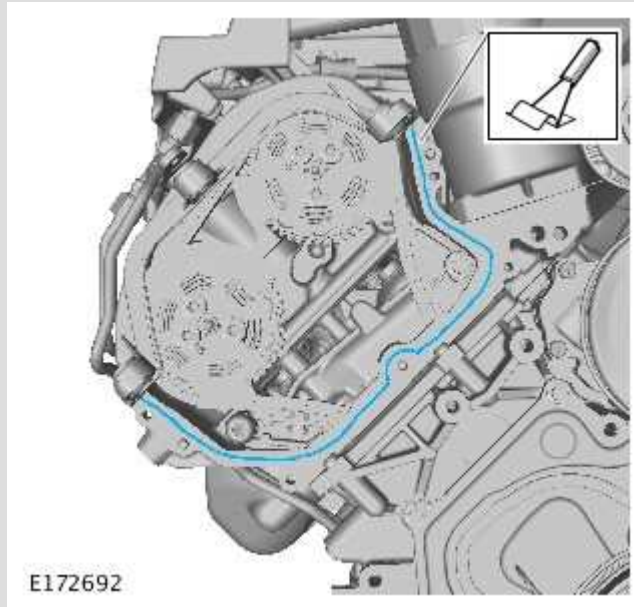
cardiagn.com

6. Refer to: Brake Vacuum Pump (206-07 Power Brake Actuation, Removal and Installation).

7. Refer to: Crankshaft Pulley (303-01A, Removal and Installation).
Refer to: Crankshaft Pulley (303-01B, Removal and Installation).

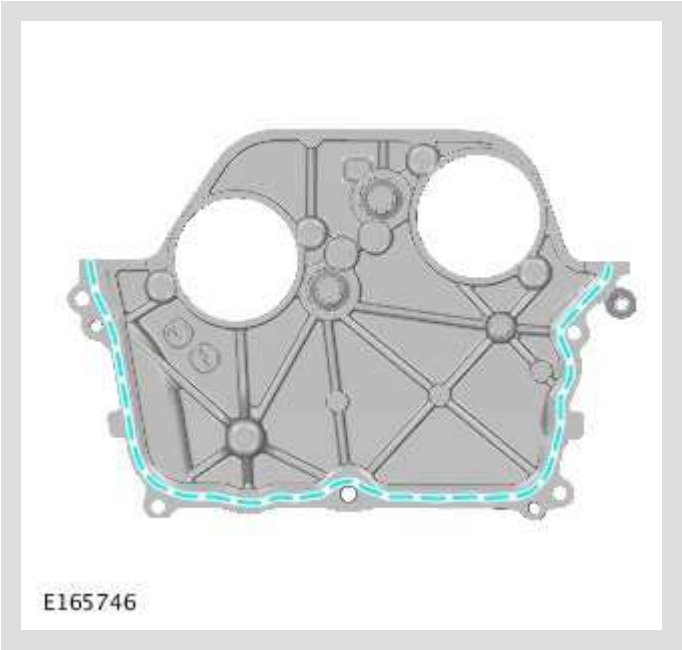
8. **CAUTIONS:**

- Use only a plastic scraper when removing the sealing material.
- Make sure that the mating faces are clean and free of foreign material.
- Make sure that the Land Rover approved cleaning fluid (Loctite 7063) is used to clean the mating faces.



9.

cardiagn.com



Apply RTV sealant (Loctite 5901G) to the areas shown, and tighten the bolts within 7 minutes.

10.

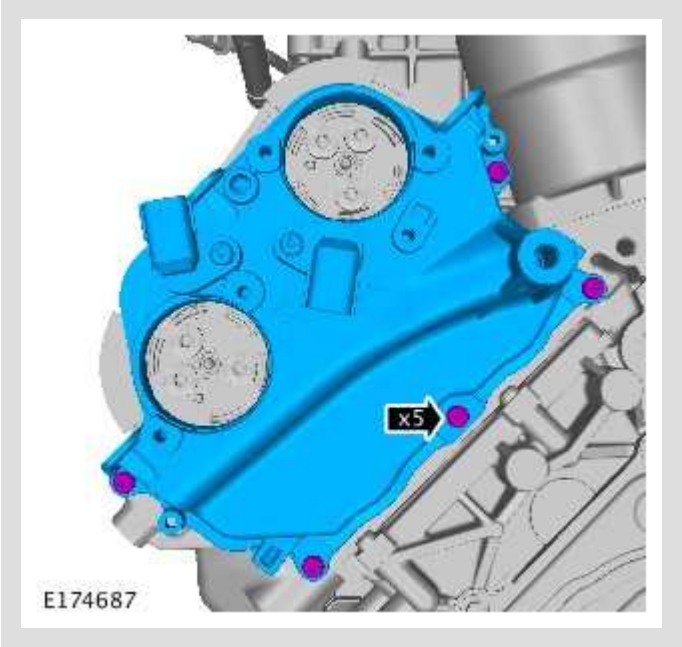
CAUTION:

Install all the bolts finger tight before final tightening.

NOTE:

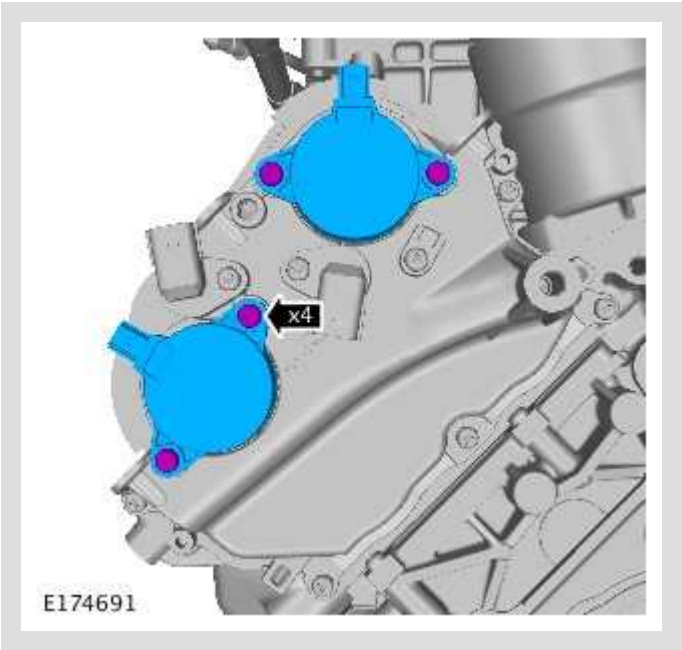
Tighten the bolts in the indicated sequence.

cardiagn.com



Torque: **12 Nm**

11.



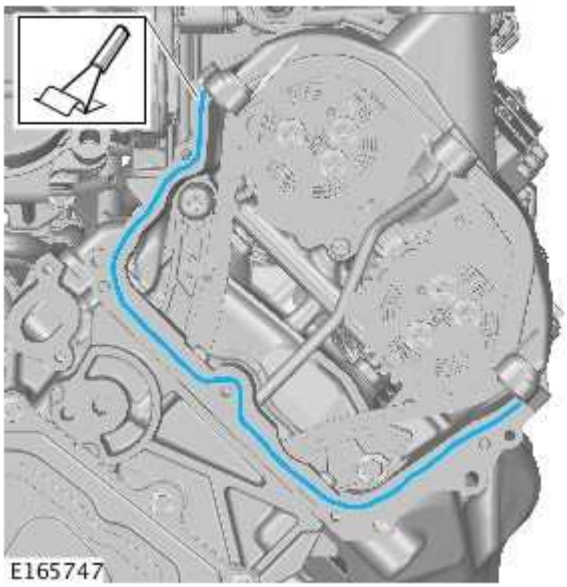
Torque: **12 Nm**

cardiagn.com

12.

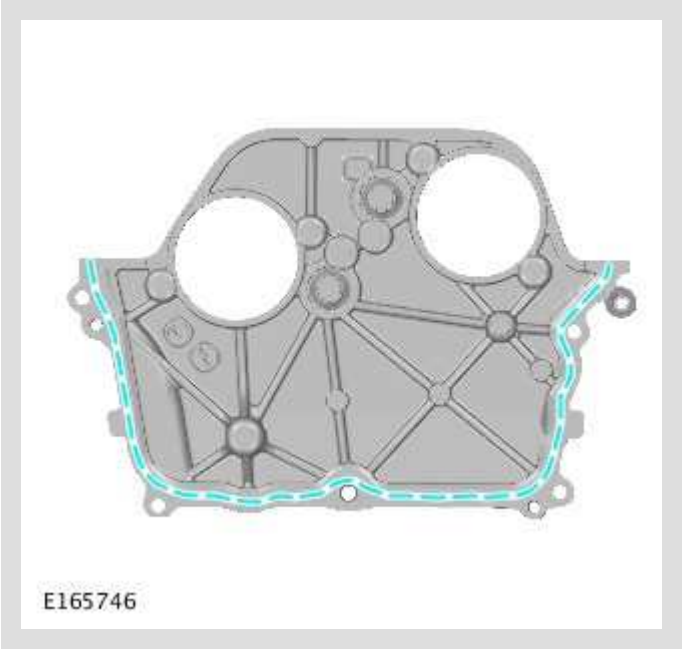
CAUTIONS:

- Use only a plastic scraper when removing the sealing material.
- Make sure that the mating faces are clean and free of foreign material.
- Make sure that the Land Rover approved cleaning fluid (Loctite 7063) is used to clean the mating faces.



13.

cardiagn.com



Apply RTV sealant (Loctite 5901G) to the areas shown, and tighten the bolts within 7 minutes.

14.

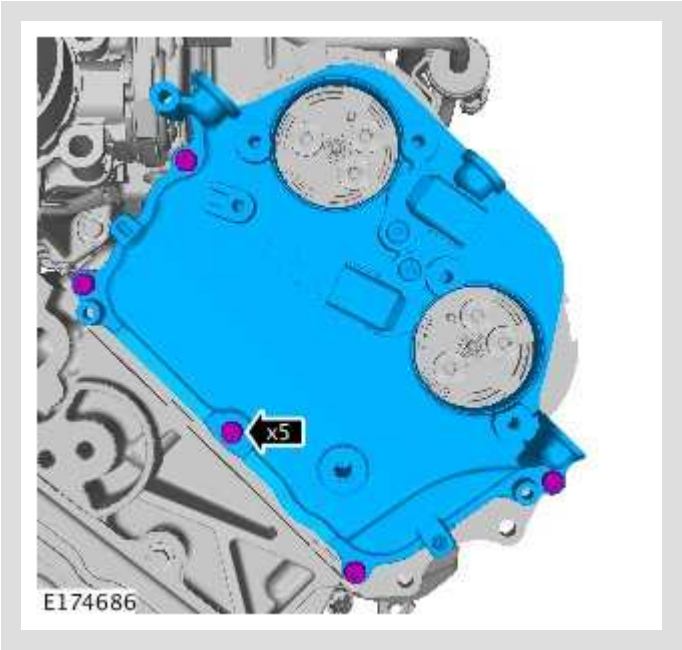
CAUTION:

Install all the bolts finger tight before final tightening.

NOTE:

Tighten the bolts in the indicated sequence.

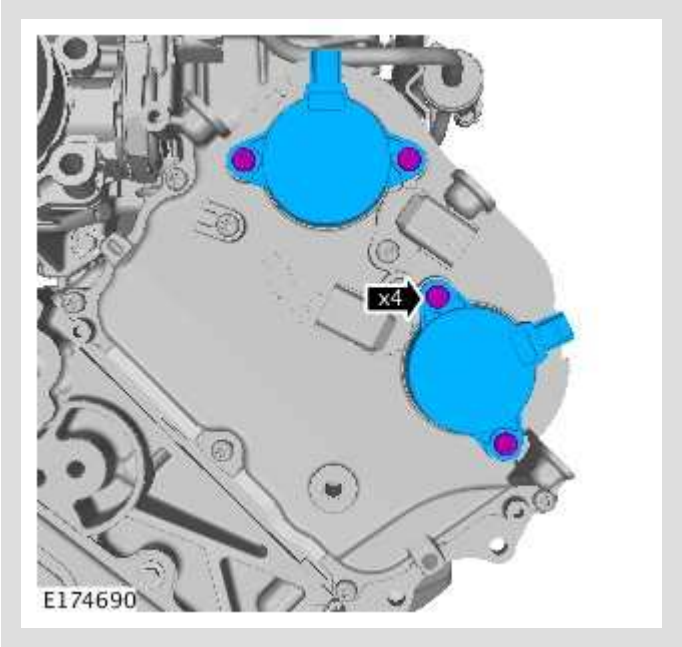
cardiagn.com



Torque: **12 Nm**

15.

cardiagn.com

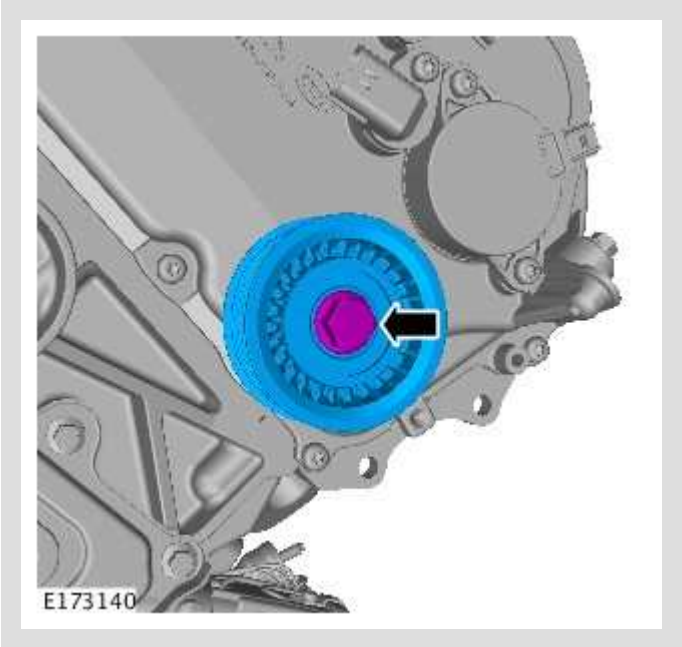


Torque: **12 Nm**

	Vehicles with electric power steering

1.

cardiagn.com



Torque: **48 Nm**

	Vehicles with hydraulic power steering

1.

cardiagn.com

Torque: **25 Nm**

Vehicles with 5.0L SC engine

1. Refer to: Valve Cover LH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).
   Refer to: Valve Cover RH (303-01B Engine - V8 S/C 5.0L Petrol, Removal and Installation).

2. Refer to: Thermostat Housing (303-03A Engine Cooling - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Accessory Drive Belt Tensioner (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

cardiagn.com

Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

Vehicles with 3.0L SC engine

1. Refer to: Valve Cover LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Valve Cover RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

2. Refer to: Electric Thermostat (303-03A Engine Cooling - V6 S /C 3.0L Petrol, Removal and Installation).
   Refer to: Thermostat Housing (303-03A Engine Cooling - V6 S /C 3.0L Petrol, Removal and Installation).
   Refer to: Accessory Drive Belt Tensioner (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).
   Refer to: Accessory Drive Belt (303-05A Accessory Drive - V6 S/C 3.0L Petrol, Removal and Installation).

All vehicles

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

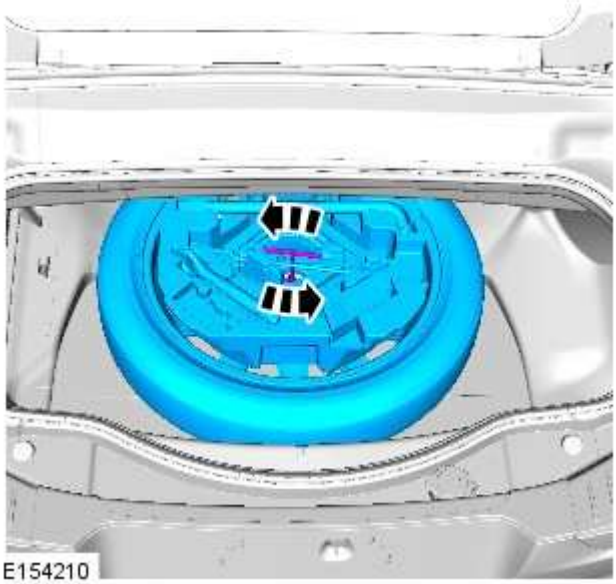
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

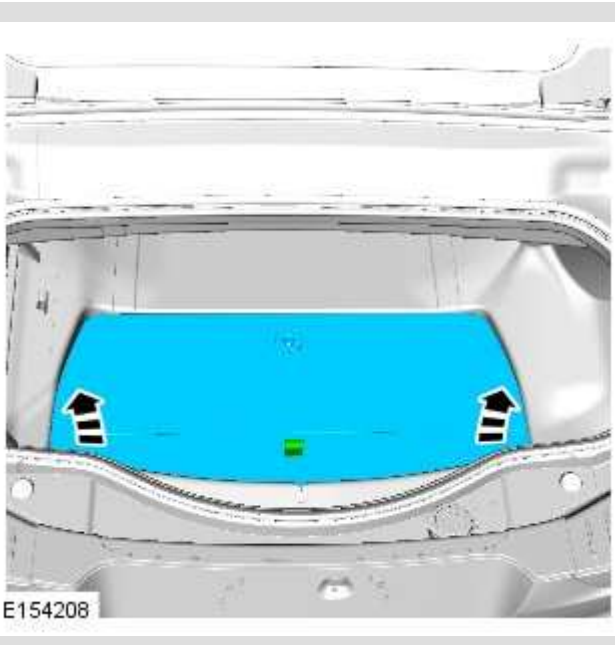
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

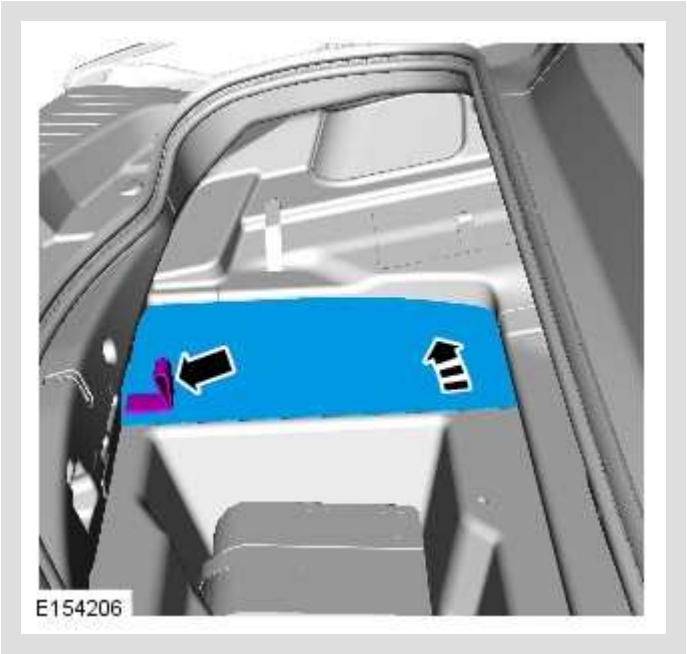


4.



cardiagn.com

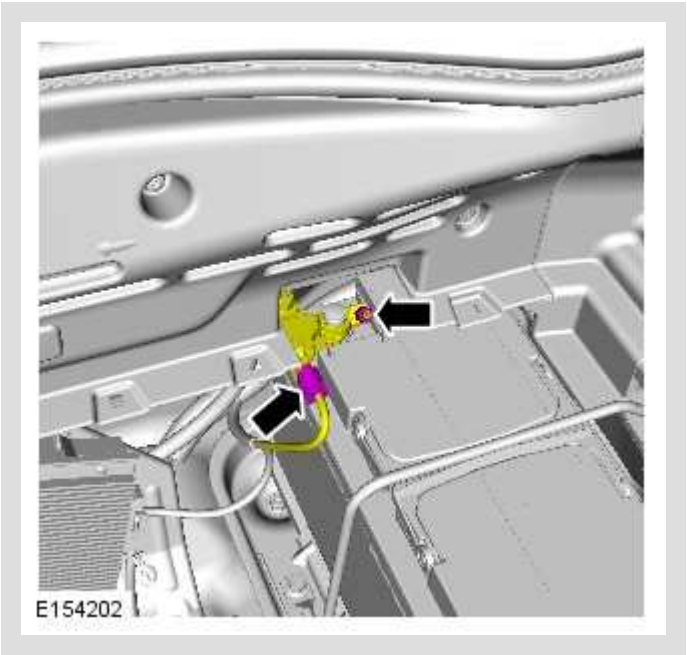
5.



6.

CAUTION:

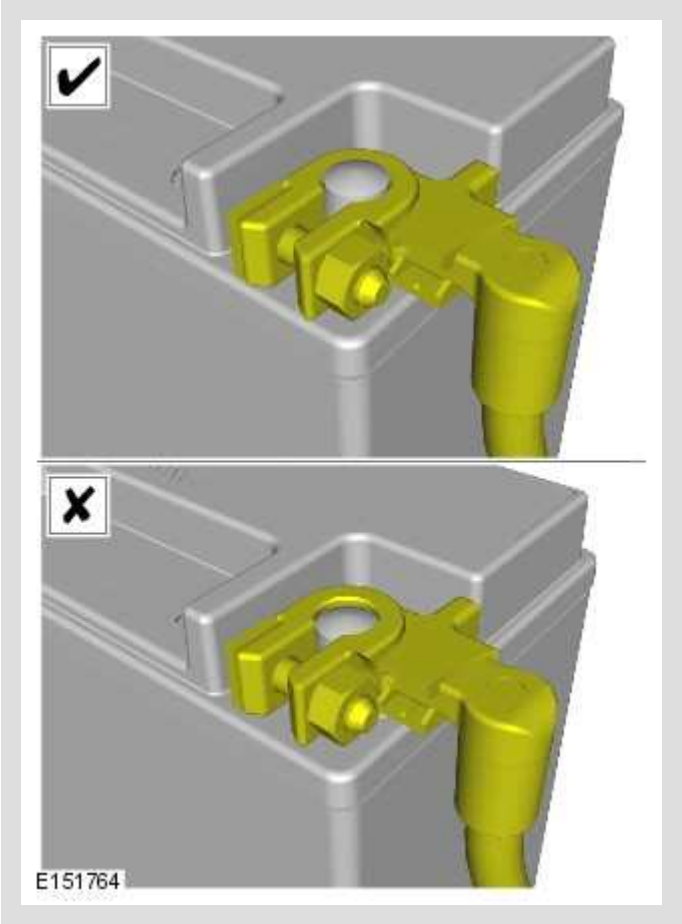
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

cardiagn.com

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

VALVE CLEARANCE ADJUSTMENT (G1666676)

GENERAL PROCEDURES

12.29.32	VALVE CLEARANCE - ENGINE SET - CHECK AND ADJUST	3000 CC, AJ V6 (AJ126)	22.3	USED WITHINS	
12.29.48	VALVE CLEARANCES - CHECK AND ADJUST	3000 CC, AJ V6 (AJ126)	20.5	USED WITHINS	

CHECK

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

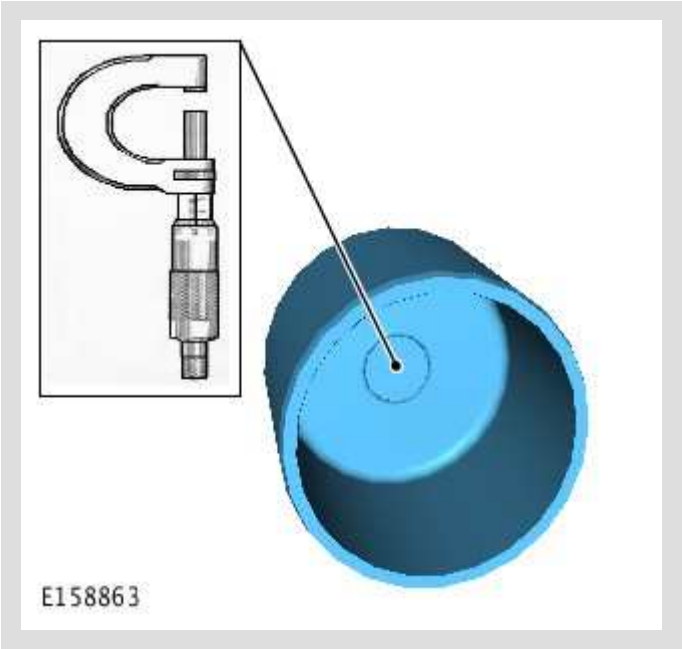
3. Refer to: Valve Clearance Check (303-01A Engine - V6 S/C 3.0 L Petrol, General Procedures).

cardiagn.com

ADJUSTMENT

1. Refer to: Camshaft RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

2. Refer to: Camshaft LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

3. 

cardiagn.com

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

CAMSHAFT LH (G1584100)

REMOVAL AND INSTALLATION

CAMSHAFT - ENGINE	3000 CC, AJ V6	USED	

12.13.01	SET - RENEW	(AJ126)	20.1	WITHINS	
12.13.19	CAMSHAFT - BANK 2 SET - RENEW	3000 CC, AJ V6 (AJ126)	17.8	USED WITHINS	

REMOVAL

CAUTION:

Make sure that the orientation and code on the top of the camshaft bearing caps is noted (along with the bank - A or B), so that on installation the components are installed to their original position. Failure to follow this instruction may cause damage to the vehicle.

NOTES:

- Removal steps in this procedure may contain installation details.
- Some variation in the illustrations may occur, but the essential information is always correct.
- Some illustrations may show the engine removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Make sure to support the vehicle with axle stands.

   Raise and support the vehicle.

cardiagn.com

3. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

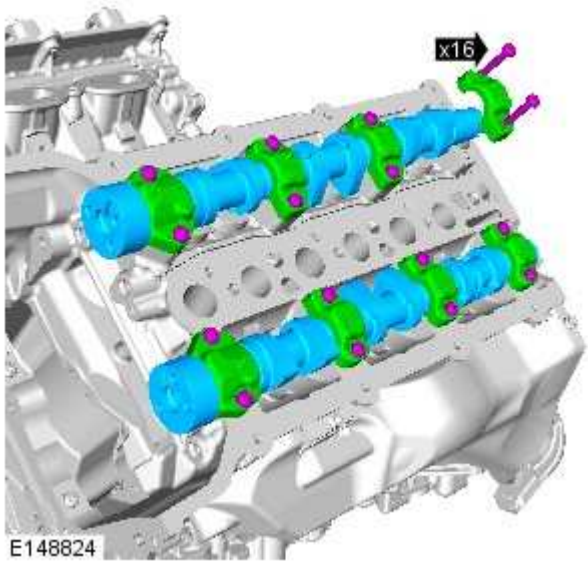
4.

CAUTIONS:

- Rotate the camshafts until all the valves are at their minimum open point.
- Evenly and progressively, release the camshaft bearing caps.

NOTE:

Remove the camshaft bearing caps. Note: their position, orientation and markings. Each is marked with its position (number) and an orientation (arrow).



INSTALLATION

1.

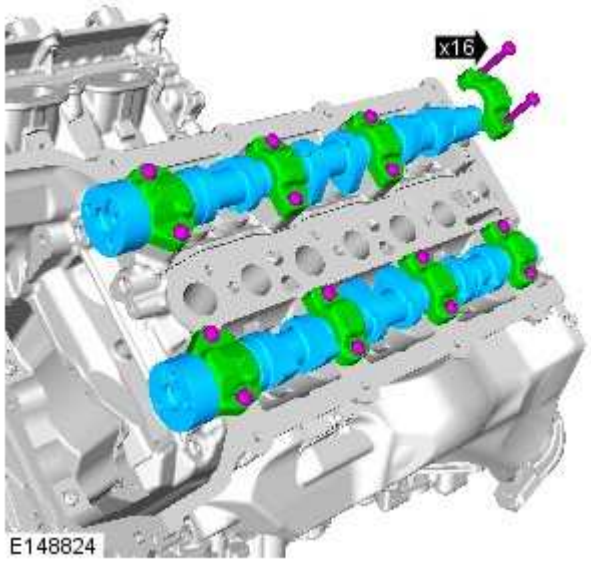
cardiagn.com

CAUTIONS:

- Prior to installing the camshafts, position the crankshaft 45 degrees ATDC cylinder 1A to prevent valve/piston collision.
- Make sure that the camshafts and camshaft bearing caps are installed in their original locations.
- Evenly and progressively install and tighten the camshaft bearing caps.

NOTE:

Lubricate the camshafts and the camshaft bearing caps with EP90 oil (or 75/90 viscosity oil will suffice) prior to installation.



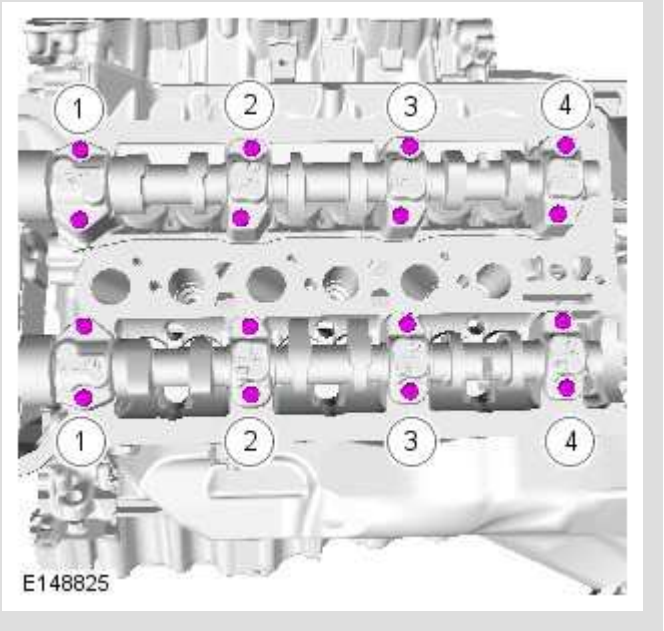
Torque: **3 Nm**

2.

cardiagn.com

NOTE:

Tighten the bolts in the indicated sequence.



Torque: **12 Nm**

3.

CAUTION:

Only rotate the crankshaft clockwise.

Rotate the crankshaft untill the camshaft lobe on the valve being checked is 180 degrees from the maximum opening position.

4.

NOTE:

If the valve clearance is incorrect, continue to the next step. If the valve clearance is correct, continue to step 8.

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

cardiagn.com

5. **CAUTIONS:**

- Do not use a magnet to remove the tappet.
- Use the following formula to calculate the required bucket thickness. Original thickness + measured clearance - desired clearance = required bucket thickness.

Remove the tappet and measure the thickness.

6. **NOTE:**

If a new tappet is installed then go back to step 1 of the install procedure.

Install a new tappet if required.

7. Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

8. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

9. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

CAMSHAFT RH (G1584101)

REMOVAL AND INSTALLATION

12.13.18	CAMSHAFT - BANK 1 SET - RENEW	3000 CC, AJ V6 (AJ126)	17.8	USED WITHINS	

REMOVAL

CAUTION:

Make sure that the orientation and code on the top of the camshaft bearing caps is noted (along with the bank - A or B), so that on installation the components are installed to their original position. Failure to follow this instruction may cause damage to the vehicle.

NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2.

cardiagn.com

WARNING:

Make sure to support the vehicle with axle stands.

Raise and support the vehicle.

3. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

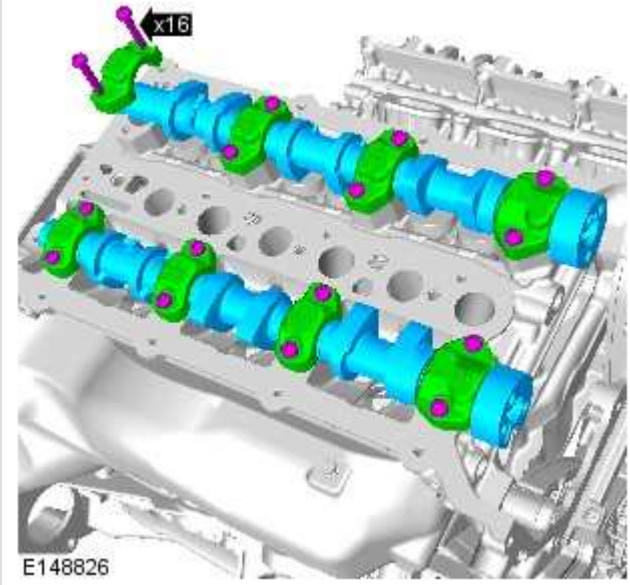
4. **CAUTIONS:**

- Rotate the camshafts until all the valves are at their minimum open point.
- Evenly and progressively, release the camshaft bearing caps.

NOTE:

Remove the camshaft bearing caps. Note: their position, orientation and markings. Each is marked with its position (number) and an orientation (arrow).

cardiagn.com



INSTALLATION

1.

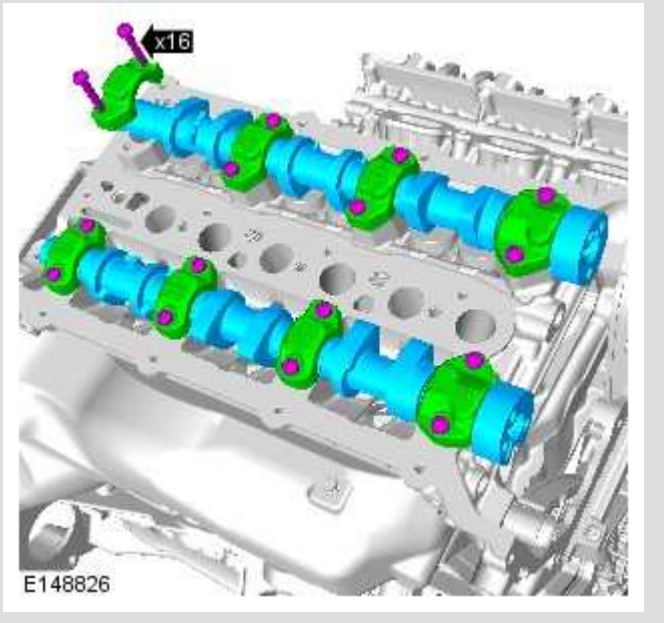
cardiagn.com

CAUTIONS:

- Prior to installing the camshafts, position the crankshaft 45 degrees ATDC cylinder 1A to prevent valve/piston collision.
- Evenly and progressively install and tighten the camshaft bearing caps.
- Make sure that the camshafts and camshaft bearing caps are installed in their original locations.

NOTE:

Lubricate the camshafts and the camshaft bearing caps with EP90 oil (or 75/90 viscosity oil will suffice) prior to installation.



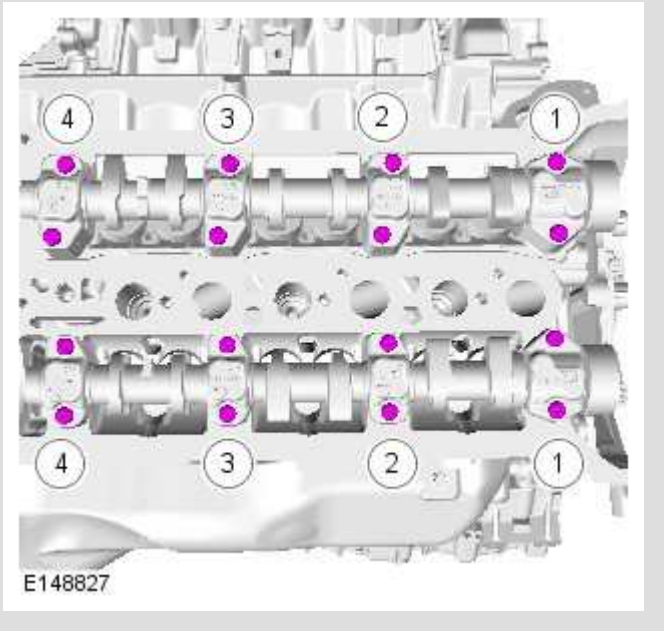
Torque: **3 Nm**

2.

cardiagn.com

NOTE:

Tighten the bolts in the indicated sequence.



Torque: **12 Nm**

3.

CAUTION:

Only rotate the crankshaft clockwise.

Rotate the crankshaft until the camshaft lobe on the valve being checked is 180 degrees from the maximum opening position.

4.

NOTE:

If the valve clearance is incorrect, continue to the next step. If the valve clearance is correct, continue to step 8.

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

cardiagn.com

5. **CAUTIONS:**

- Use the following formula to calculate the required bucket thickness. Original thickness + measured clearance - desired clearance = required bucket thickness.
- Do not use a magnet to remove the tappet.

Remove the tappet and measure the thickness.

6. **NOTE:**

If a new tappet is installed then go back to step 1 of the install procedure.

Install a new tappet if required.

7. Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

8. Refer to: Timing Drive Components (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

9. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

VALVE CLEARANCE CHECK (G1666675)

GENERAL PROCEDURES

12.29.36	VALVE CLEARANCE - ENGINE SET - CHECK	3000 CC, AJ V6 (AJ126)	8.6	USED WITHINS	
12.29.47	VALVE CLEARANCES - CHECK	3000 CC, AJ V6 (AJ126)	8.8	USED WITHINS	

CHECK

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

3. Refer to: Valve Cover LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

4. Refer to: Valve Cover RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

5.

cardiagn.com

CAUTIONS:

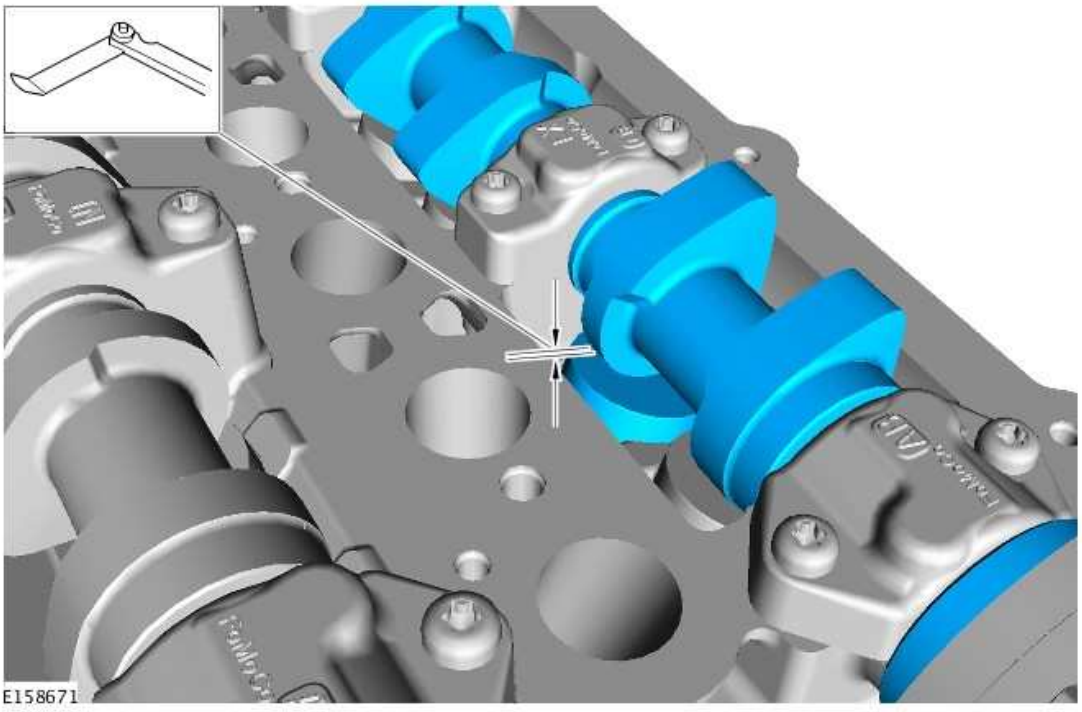
Rotate the engine clockwise until the camshafts are positioned as shown.

Do not rotate the crankshaft counterclockwise. The timing chains may bind causing engine damage.

Camshaft lobes must be 180 degrees away from each valve tappet or valve clearance will be incorrect.

NOTE:

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.



cardiagn.com

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

1. Repeat for the remaining valve tappets.

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS	

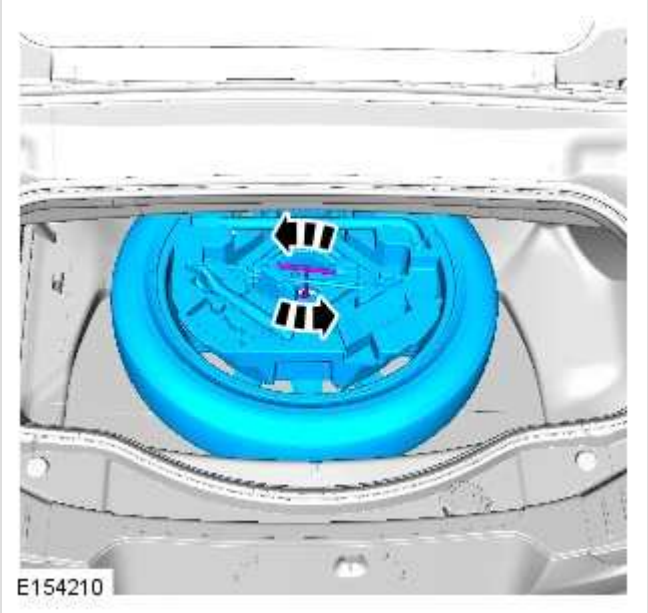
△ NOTES:

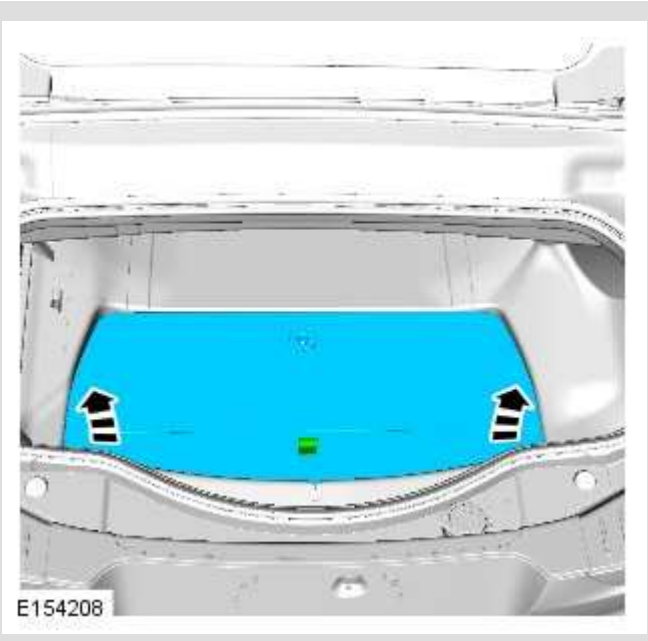
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

cardiagn.com

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

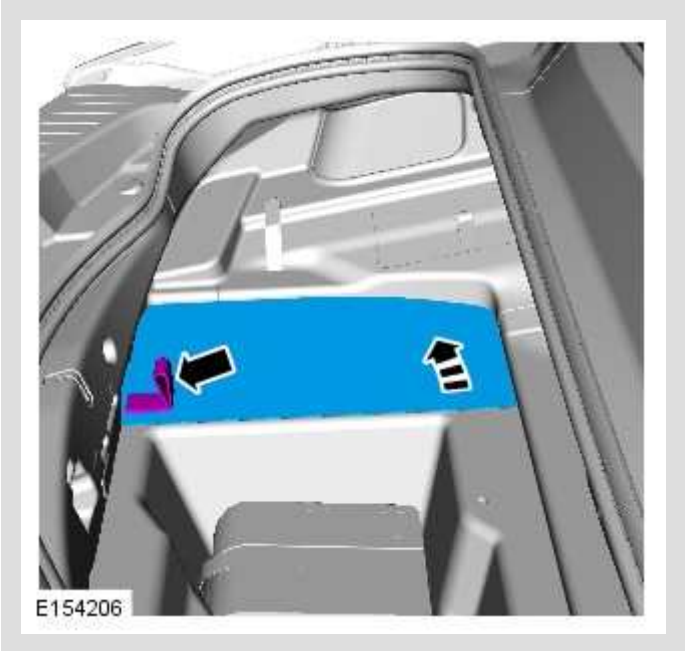
2. Obtain and record the audio unit preset radio frequencies.

3. 

4. 

5.

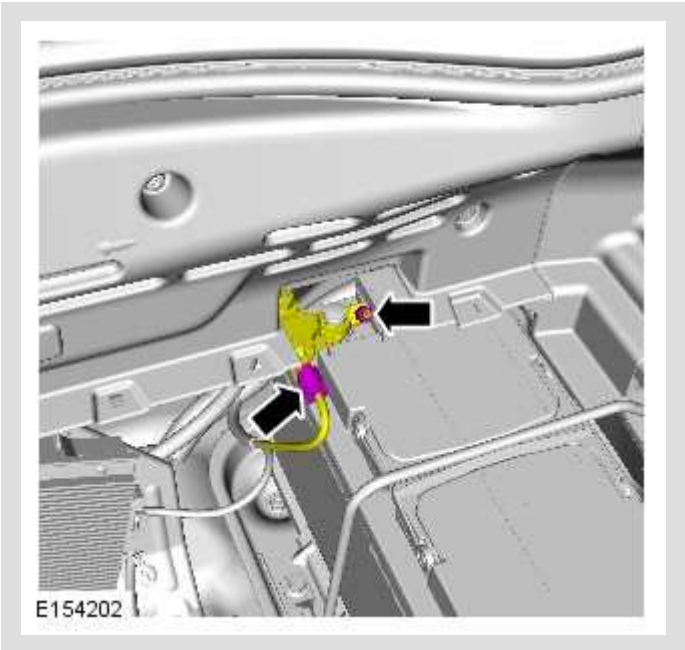
cardiagn.com



6.

CAUTION:

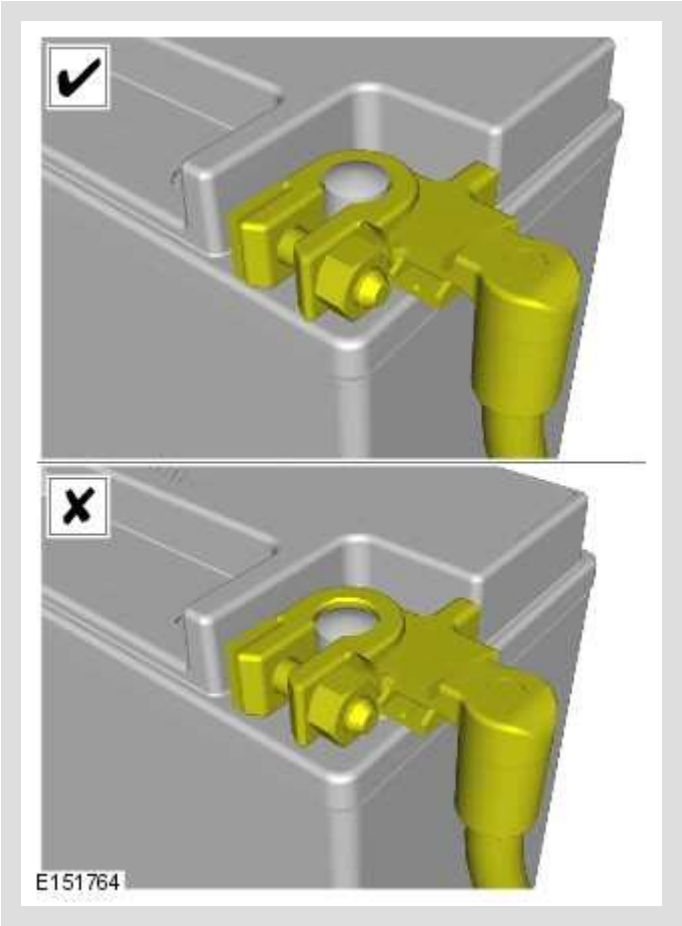
Take extra care not to damage the wiring harnesses.



cardiagn.com

Torque: **6 Nm**

7.



8. To install, reverse the removal procedure.

9.

NOTE:

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

cardiagn.com

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

VALVE CLEARANCE CHECK (G1666675)

GENERAL PROCEDURES

12.29.36	VALVE CLEARANCE - ENGINE SET - CHECK	3000 CC, AJ V6 (AJ126)	8.6	USED WITHINS	
12.29.47	VALVE CLEARANCES - CHECK	3000 CC, AJ V6 (AJ126)	8.8	USED WITHINS	

CHECK

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

3. Refer to: Valve Cover LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

4. Refer to: Valve Cover RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

cardiagn.com

5.

CAUTIONS:

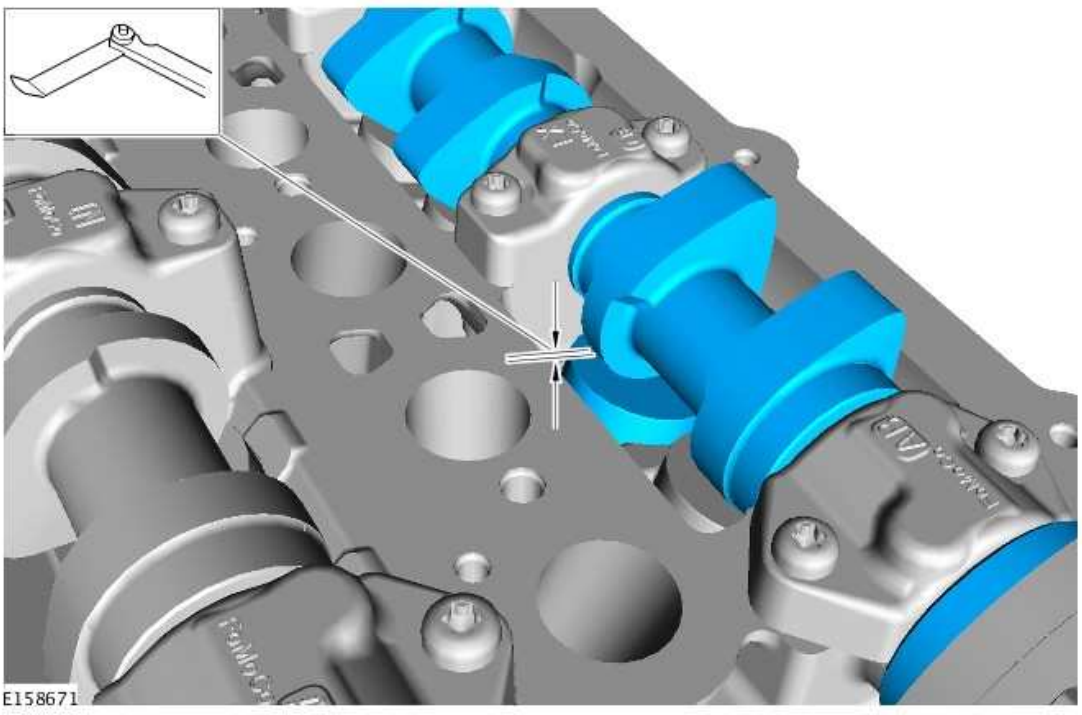
Rotate the engine clockwise until the camshafts are positioned as shown.

Do not rotate the crankshaft counterclockwise. The timing chains may bind causing engine damage.

Camshaft lobes must be 180 degrees away from each valve tappet or valve clearance will be incorrect.

NOTE:

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.



cardiagn.com

Using feeler gauge check the gap between the tappet and the camshaft lobe and check against specifications table.

1. Repeat for the remaining valve tappets.

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

VALVE COVER RH (G1584121)

REMOVAL AND INSTALLATION

12.29.44	CAMSHAFT COVER - RIGHT HAND - RENEW	3000 CC, AJ V6 (AJ126)	6.5	USED WITHINS	

SPECIAL TOOL(S)

303-1446

Valve Cover Alignment Tool

cardiagn.com

REMOVAL

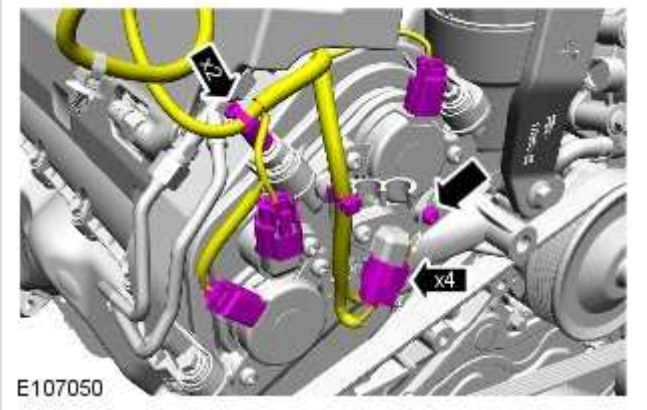
NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Supercharger (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

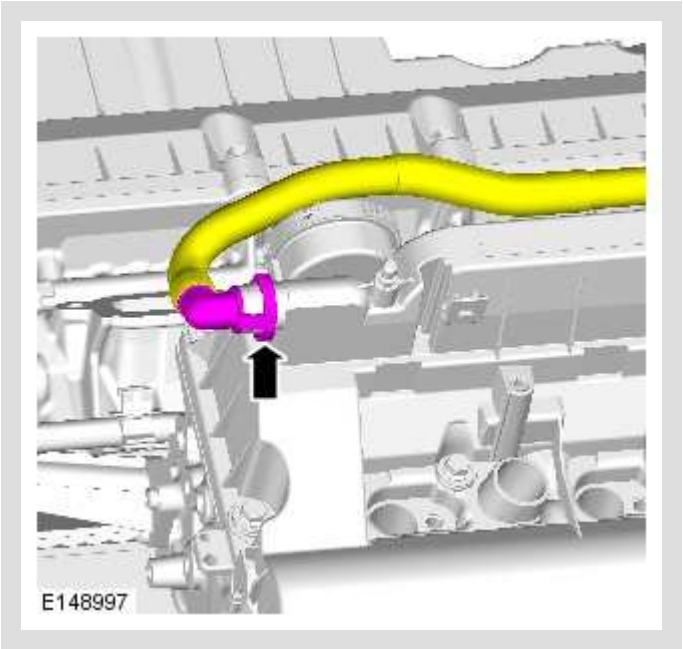
3. Refer to: Fuel Rail RH (303-04A Fuel Charging and Controls - V6 S/C 3.0L Petrol, Removal and Installation).

4. 

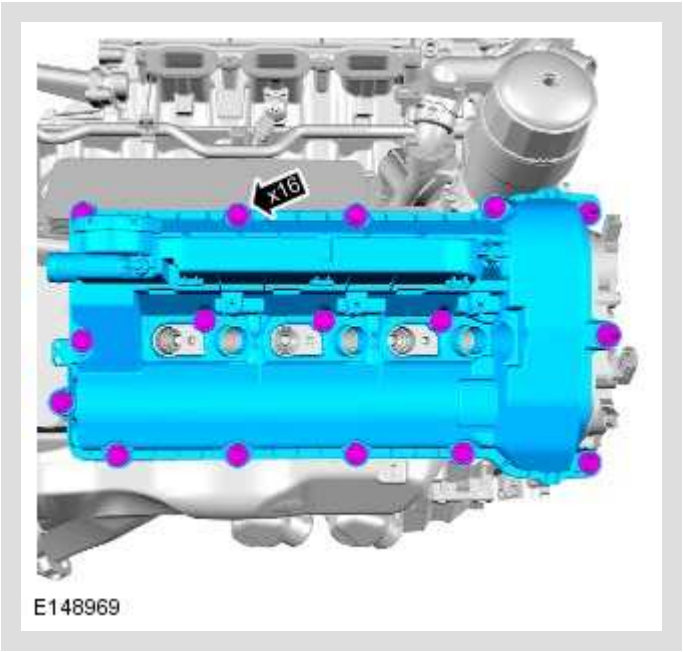
Torque: **10 Nm**

5.

cardiagn.com



6.



INSTALLATION

1.

CAUTIONS:

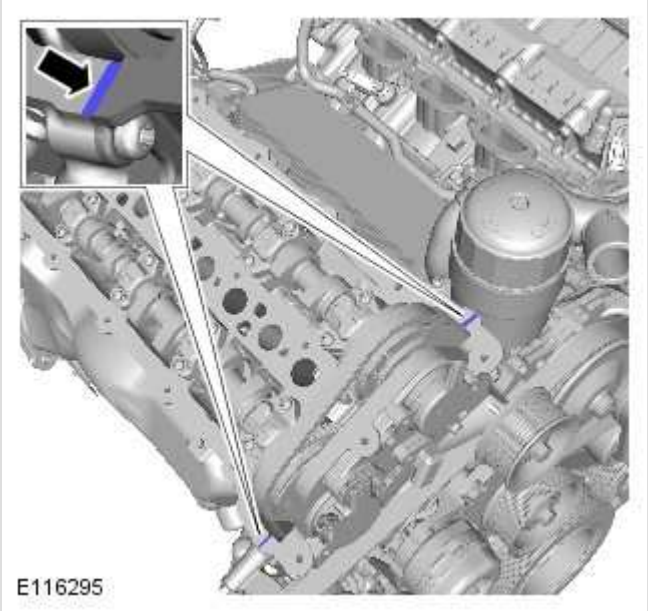
- Use only a plastic scraper when removing the sealing material.

cardiagn.com

- Use lint free cloth.
- Make sure that the mating faces are clean and free of corrosion and foreign material.
- Installation of the valve cover and tightening must be carried out within 7 minutes of applying the sealant.

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Apply two beads of silcone gasket sealant (Loctite 5901G or Loctite 5900) as shown on the illustration. The application of the sealant must be 1.5mm diameter 12mm long. Install the valve cover immediately after applying the sealant. The cover should be fitted directly to the head without smearing the sealant or the seals.

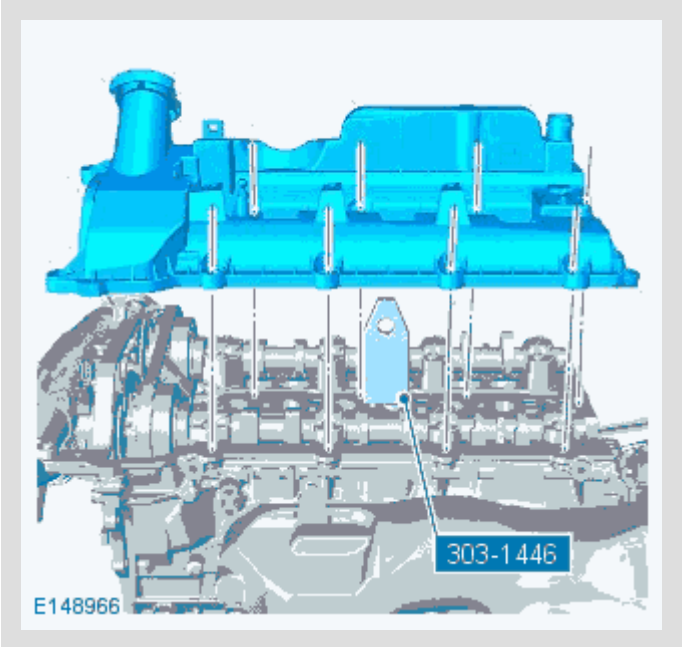


2.

NOTE:

cardiagn.com

LH illustration shown, RH is similar.

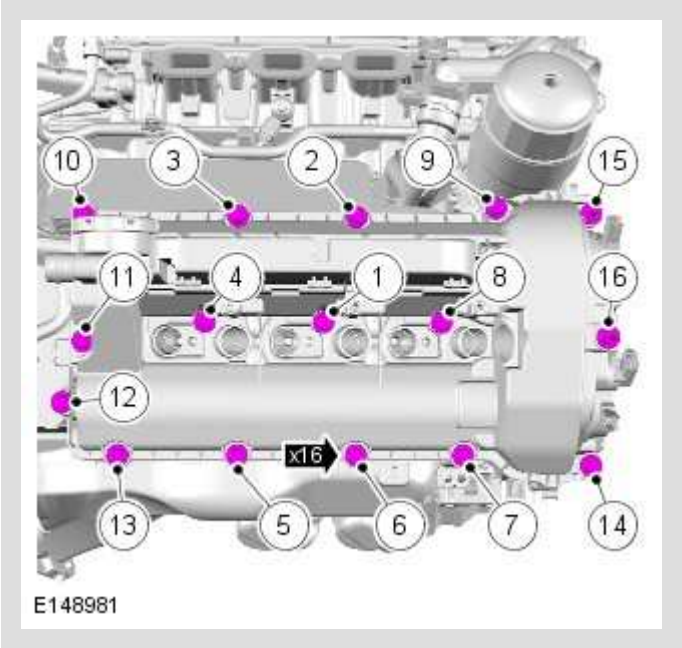


Special Tool(s): 303-1446

3.

NOTE:

Tighten the bolts in the indicated sequence.

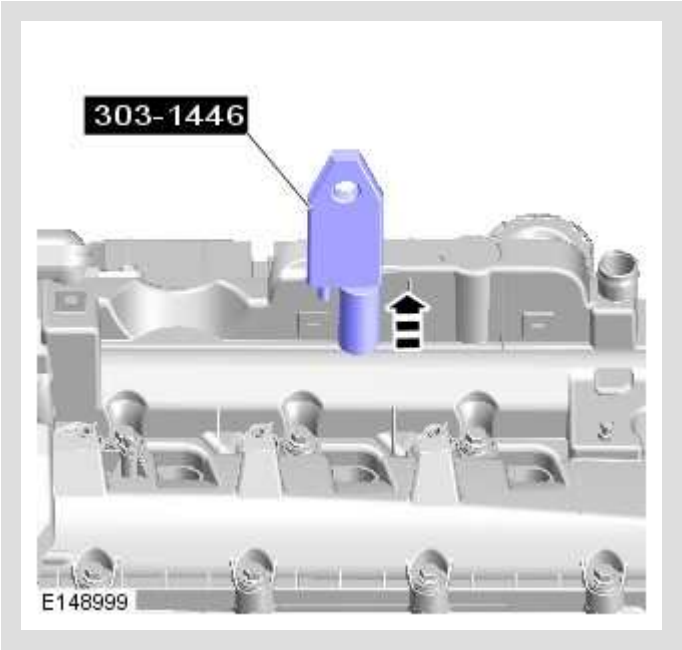


Torque: **13 Nm**

cardiagn.com

4. **NOTE:**

LH illustration shown, RH is similar.



Special Tool(s): 303-1446

5. To install, reverse the removal procedure.

cardiagn.com

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

BATTERY DISCONNECTION AND

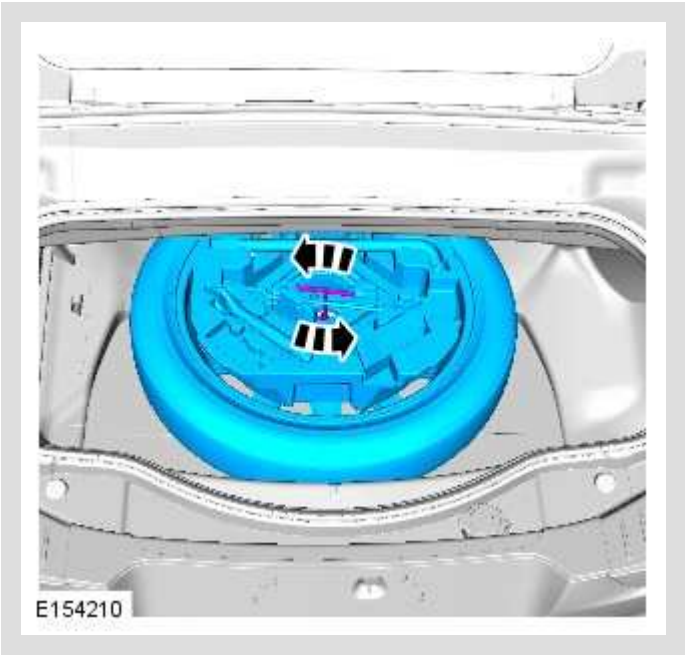
86.15.15	RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

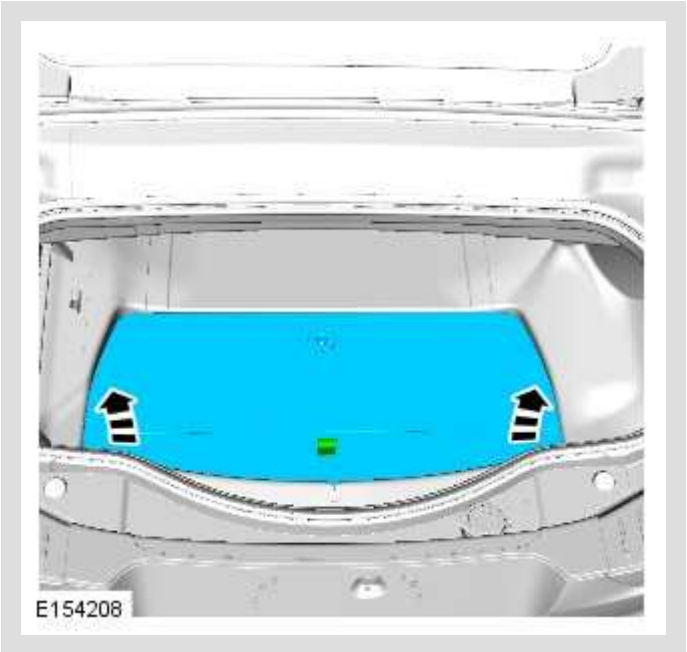
1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

2. Obtain and record the audio unit preset radio frequencies.

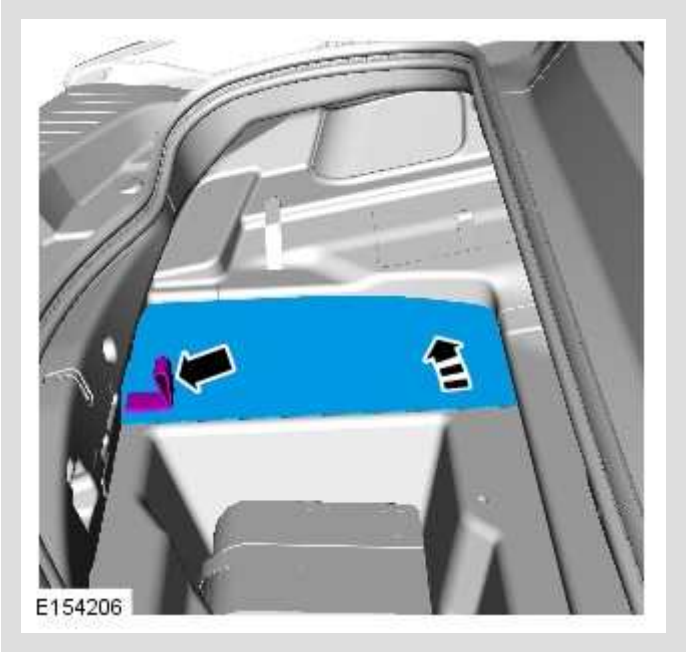
3. 

4.

cardiagn.com



5.

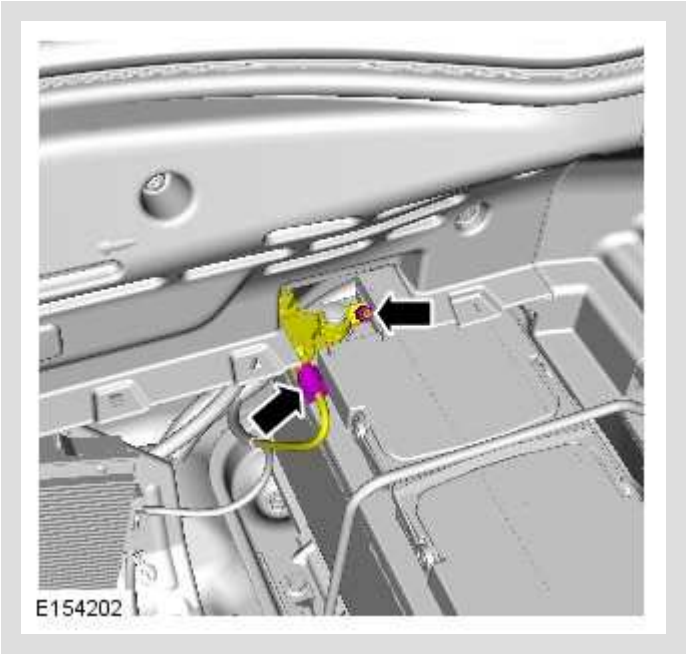


6.

CAUTION:

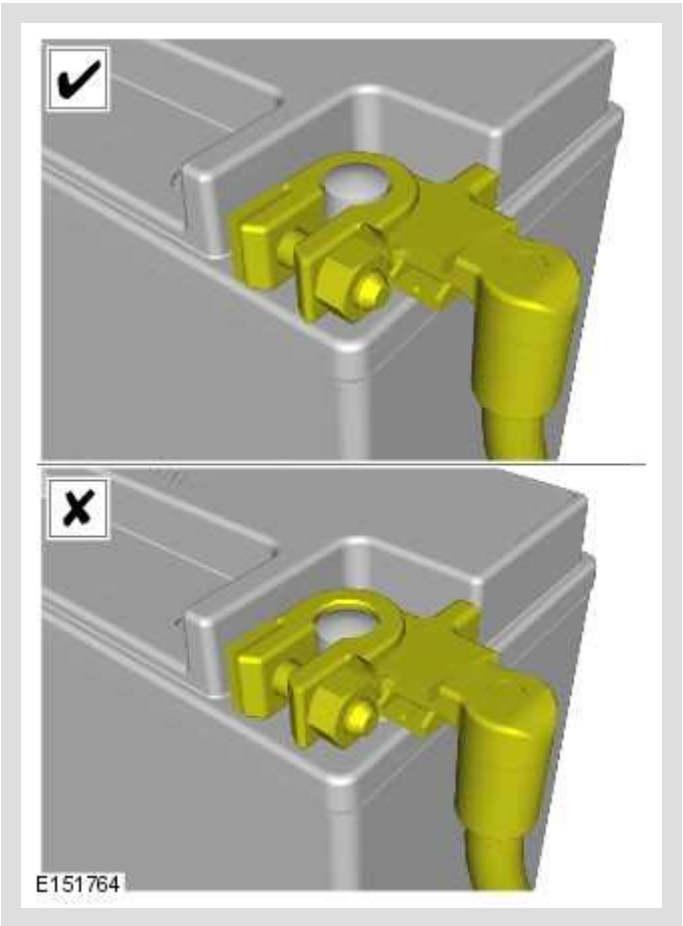
Take extra care not to damage the wiring harnesses.

cardiagn.com



Torque: **6 Nm**

7.



8. To install, reverse the removal procedure.

cardiagn.com

9. **NOTE:**

This step is only necessary when installing a new battery.

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

VALVE COVER LH (G1584120)

REMOVAL AND INSTALLATION

12.29.43	CAMSHAFT COVER - LEFT HAND - RENEW	3000 CC, AJ V6 (AJ126)	5.7	USED WITHINS	

SPECIAL TOOL(S)

	303-1446 Valve Cover Alignment Tool

REMOVAL

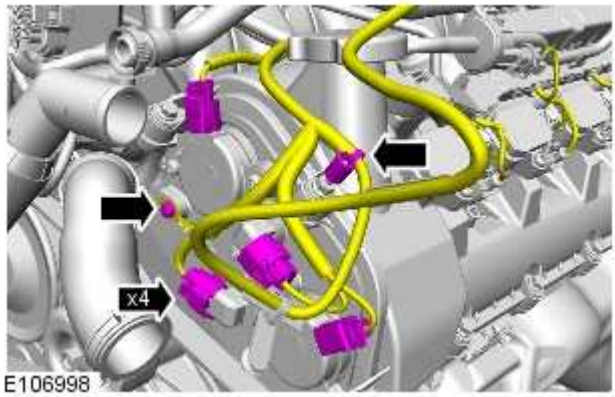
NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
2. Refer to: Supercharger (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).
3. Refer to: Fuel Rail LH (303-04A Fuel Charging and Controls - V6 S/C 3.0L Petrol, Removal and Installation).

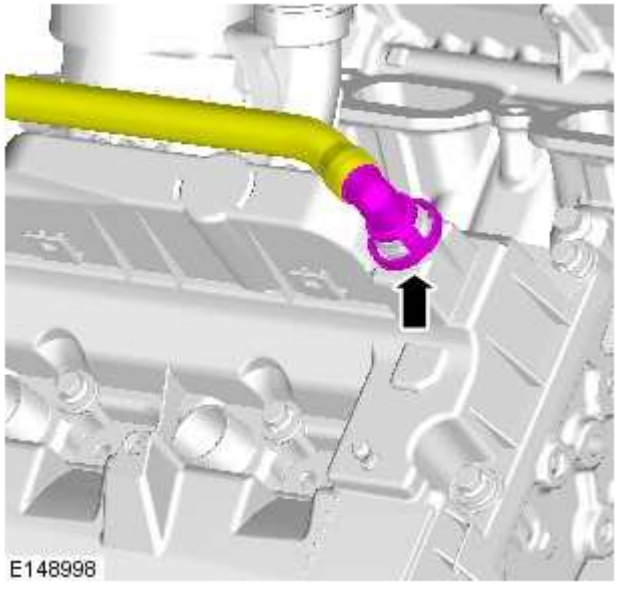
cardiagn.com

4.



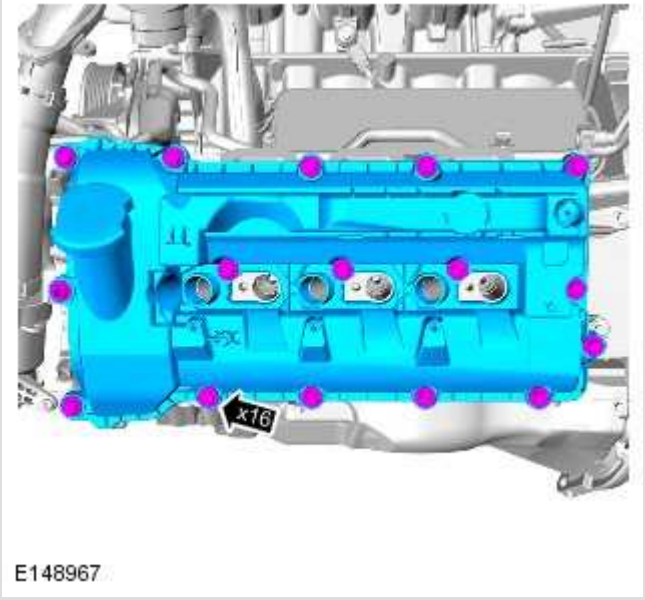
Torque: **10 Nm**

5.



6.

cardiagn.com



INSTALLATION

1.

CAUTIONS:

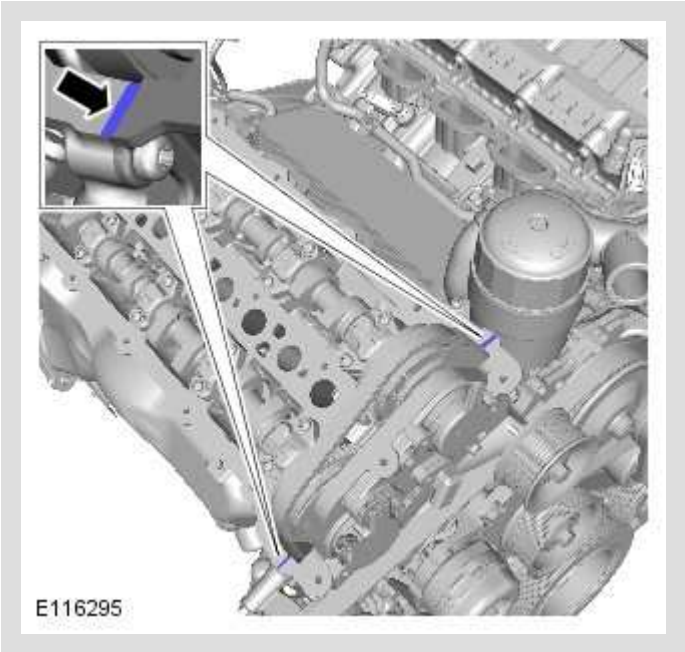
- Use only a plastic scraper when removing the sealing material.
- Use lint free cloth.
- Make sure that the mating faces are clean and free of corrosion and foreign material.
- Installation of the valve cover and tightening must be carried out within 7 minutes of applying the sealant.

NOTES:

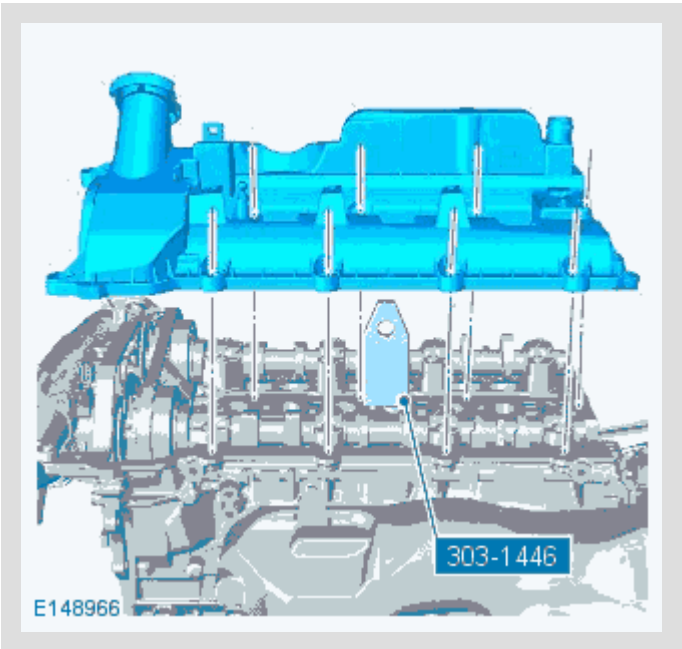
- RH illustration shown, LH is similar.
- Some variation in the illustrations may occur, but the essential information is always correct.
- Apply two beads of silcone gasket sealant (Loctite 5901G or Loctite 5900) as shown on the illustration.

cardiagn.com

The application of the sealant must be 1.5mm diameter 12mm long. Install the valve cover immediately after applying the sealant. The cover should be fitted directly to the head without smearing the sealant or the seals.



2.



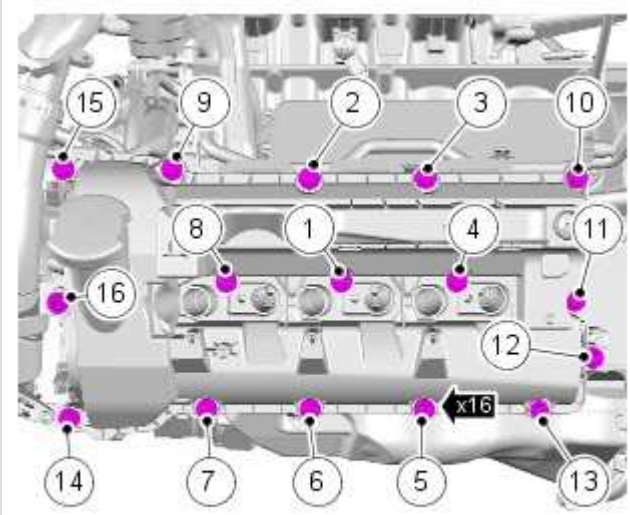
Special Tool(s): 303-1446

3.

NOTE:

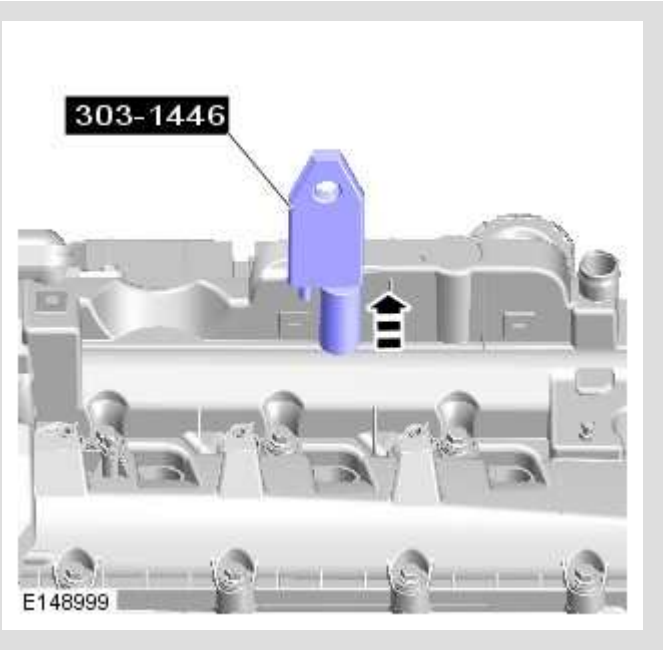
cardiagn.com

Tighten the bolts in the indicated sequence.



Torque: **13 Nm**

4.



Special Tool(s): 303-1446

5. To install, reverse the removal procedure.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

VALVE COVER LH (G1584120)

REMOVAL AND INSTALLATION

12.29.43	CAMSHAFT COVER - LEFT HAND - RENEW	3000 CC, AJ V6 (AJ126)	5.7	USED WITHINS	

SPECIAL TOOL(S)

303-1446

Valve Cover Alignment Tool

REMOVAL

cardiagn.com

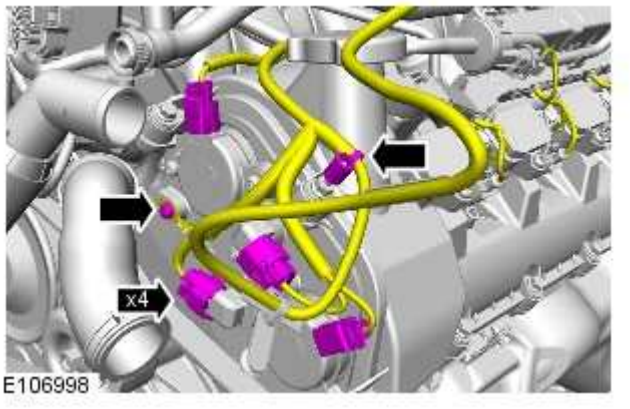
NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Supercharger (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

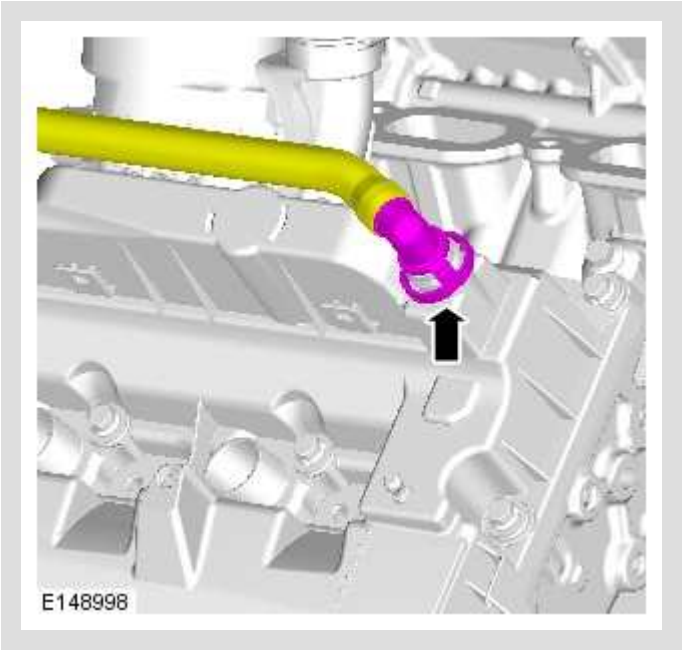
3. Refer to: Fuel Rail LH (303-04A Fuel Charging and Controls - V6 S/C 3.0L Petrol, Removal and Installation).

4. 

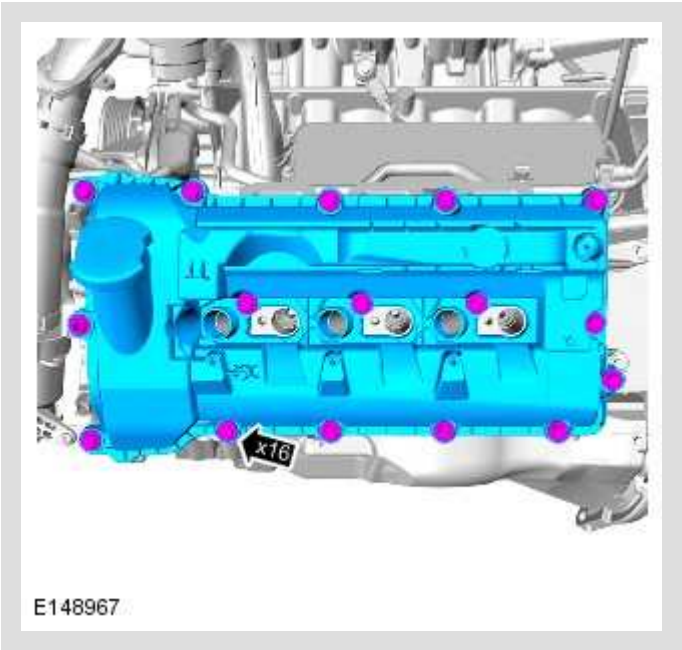
   Torque: **10 Nm**

5.

cardiagn.com



6.



INSTALLATION

cardiagn.com

1.

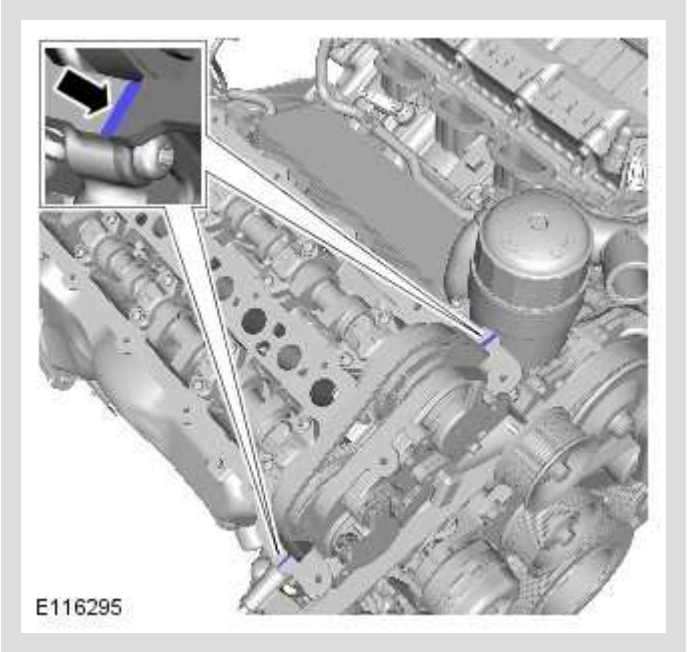
CAUTIONS:

- Use only a plastic scraper when removing the sealing material.
- Use lint free cloth.
- Make sure that the mating faces are clean and free of corrosion and foreign material.
- Installation of the valve cover and tightening must be carried out within 7 minutes of applying the sealant.

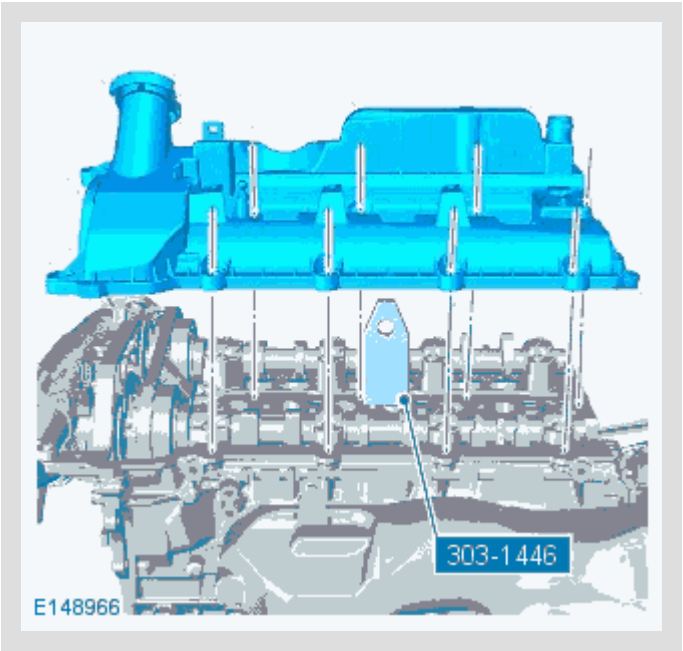
NOTES:

- RH illustration shown, LH is similar.
- Some variation in the illustrations may occur, but the essential information is always correct.
- Apply two beads of silcone gasket sealant (Loctite 5901G or Loctite 5900) as shown on the illustration. The application of the sealant must be 1.5mm diameter 12mm long. Install the valve cover immediately after applying the sealant. The cover should be fitted directly to the head without smearing the sealant or the seals.

cardiagn.com



2.

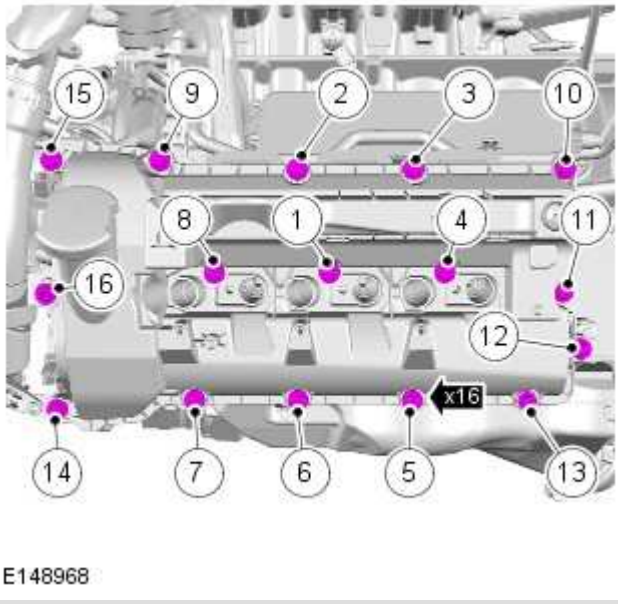


Special Tool(s): 303-1446

cardiagn.com

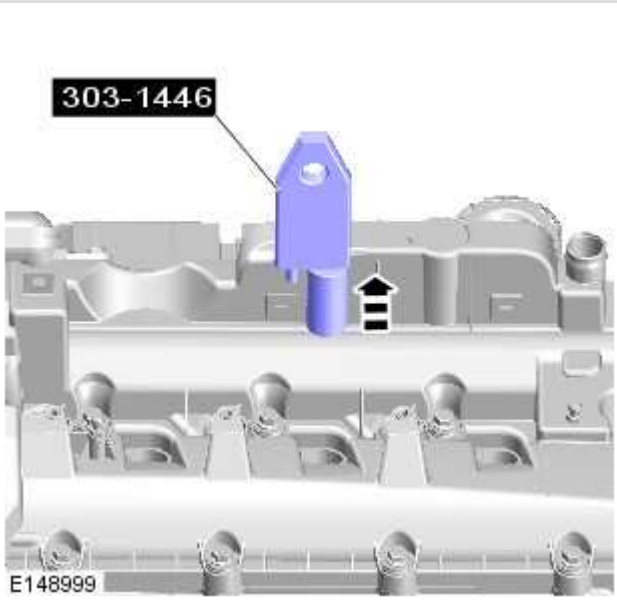
3. **NOTE:**

Tighten the bolts in the indicated sequence.



Torque: **13 Nm**

4.



Special Tool(s): 303-1446

5. To install, reverse the removal procedure.

cardiagn.com

2015.0 F-TYPE (X152), 303-12

INTAKE AIR DISTRIBUTION AND FILTERING - V6 S/C 3.0L PETROL

SUPERCHARGER (G1580354)

REMOVAL AND INSTALLATION

18.50.15	SUPERCHARGER ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	3.3	USED WITHINS

SPECIAL TOOL(S)

E115267

303-1449-01

Supercharger Installation Guide Pins - Threaded

E115267

303-1449-02

Supercharger Installation Guide Pins - Unthreaded

cardiagn.com

REMOVAL

CAUTION:

If a new cylinder head has been installed, then new taptite bolts must be used to install the supercharger.

NOTES:

- New taptite bolts when used cut their own threads on the first application.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

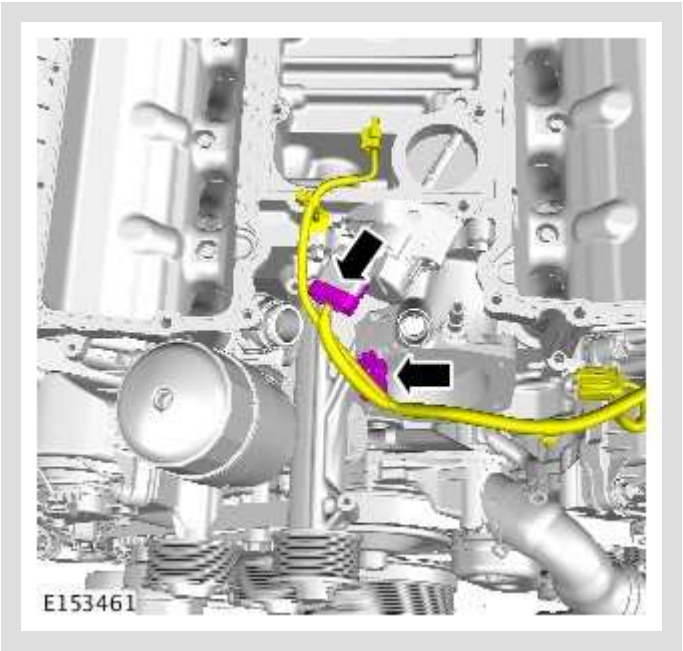
3. Refer to: Charge Air Cooler (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

4. Refer to: Throttle Body (303-04B Fuel Charging and Controls - V8 S/C 5.0L Petrol, Removal and Installation).

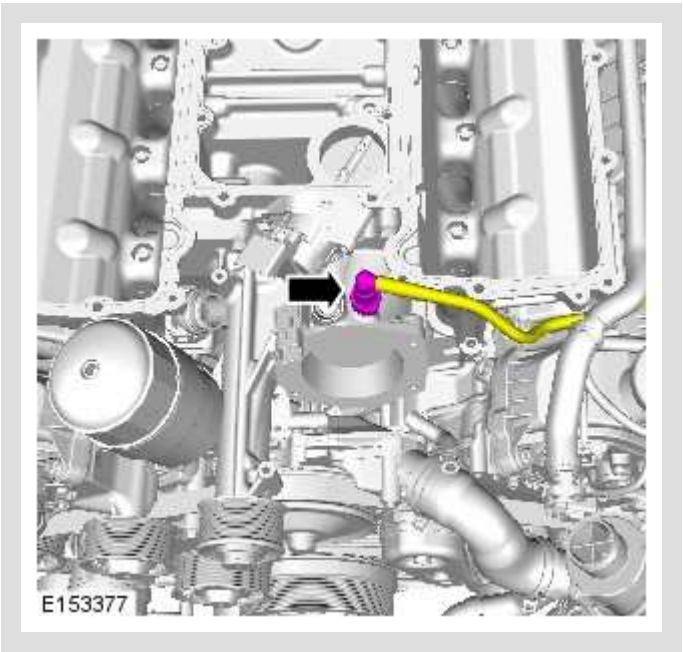
cardiagn.com

5. Refer to: Supercharger Belt (303-05B Accessory Drive - V8 S/C 5.0L Petrol, Removal and Installation).

6.

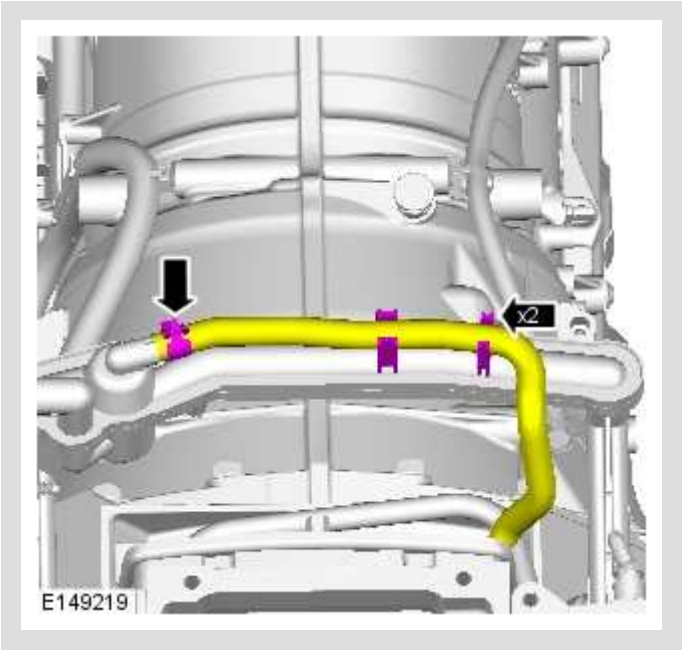


7.

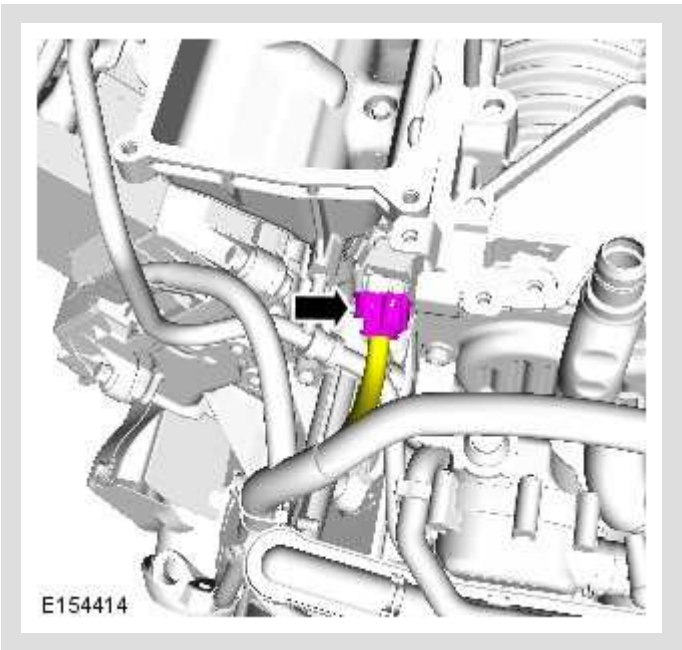


8.

cardiagn.com

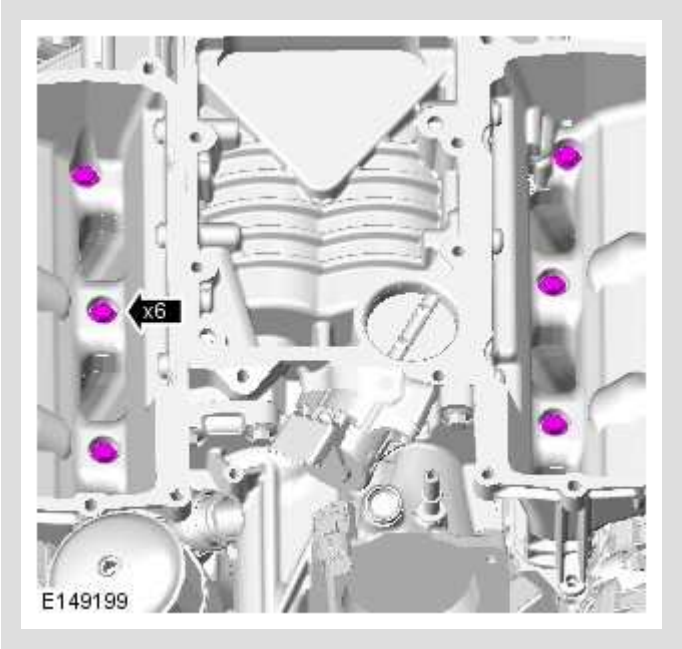


9.

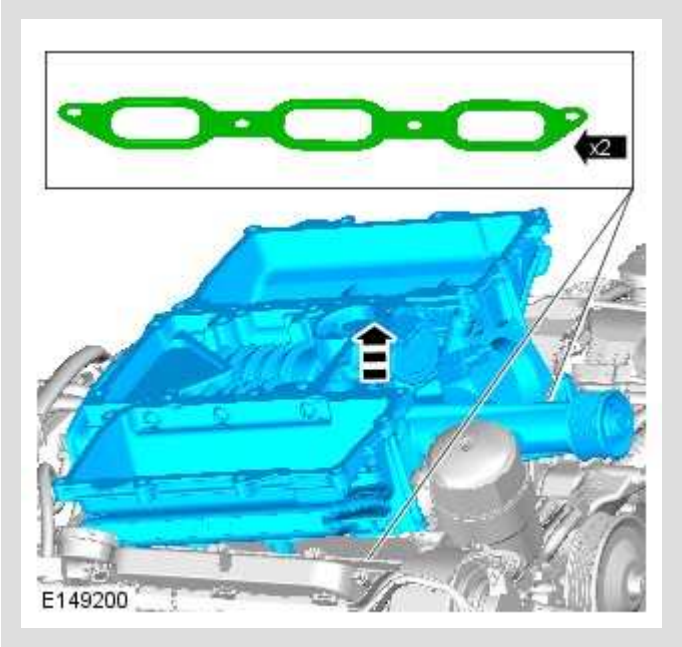


10.

cardiagn.com



11.



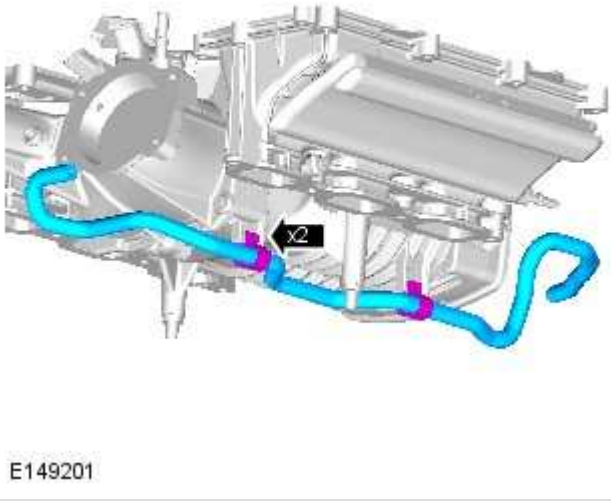
Discard the gaskets.

12.

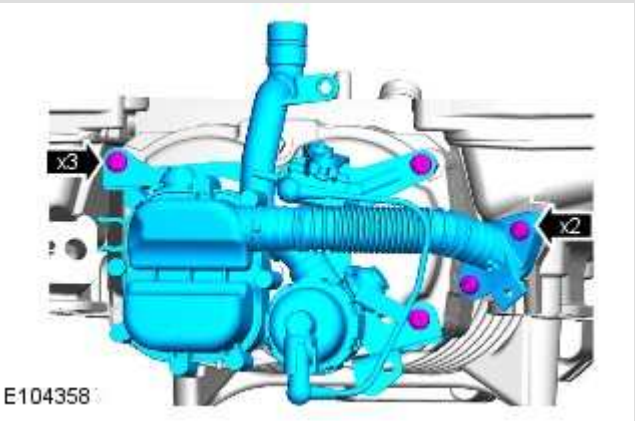
cardiagn.com

NOTE:

Do not disassemble further if the component is removed for access only.

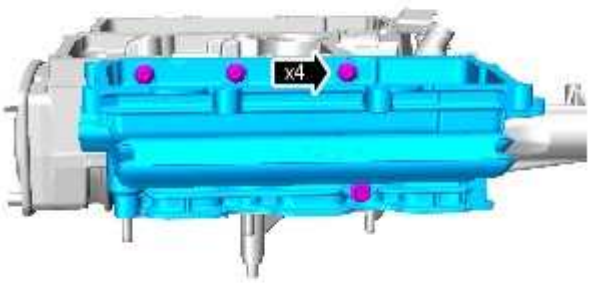


13.



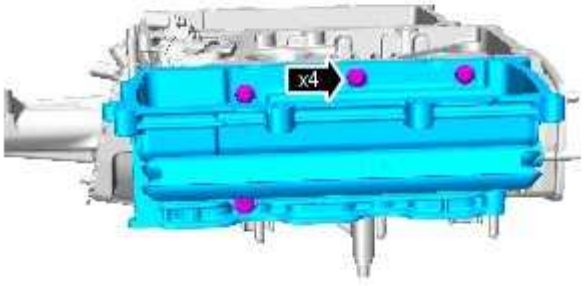
14.

cardiagn.com



E153535

15.



E153534

cardiagn.com

INSTALLATION

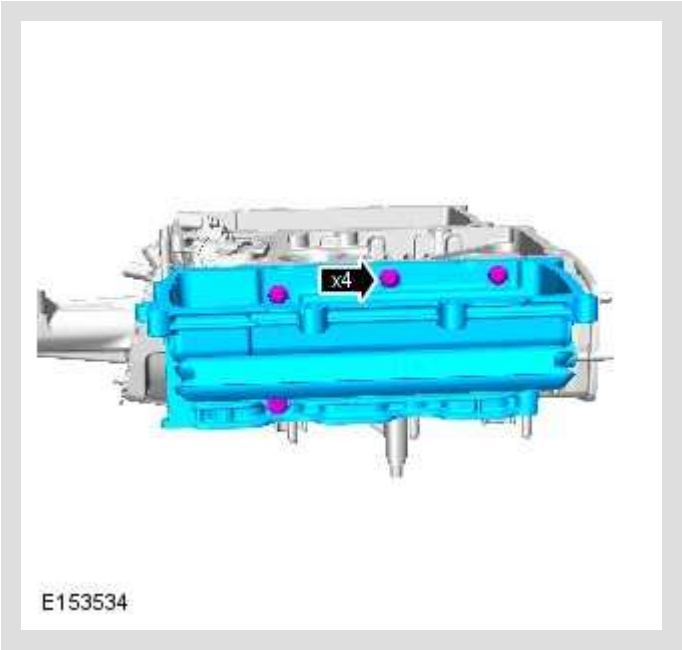
CAUTION:

If a new cylinder head has been installed, then new taptite bolts must be used to install the supercharger.

NOTE:

New taptite bolts when used cut their own threads on the first application.

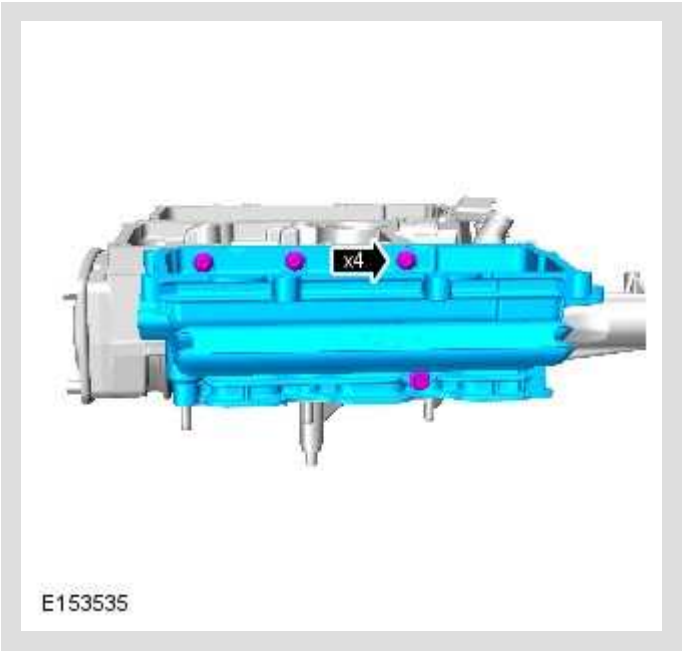
1.



Torque: **25 Nm**

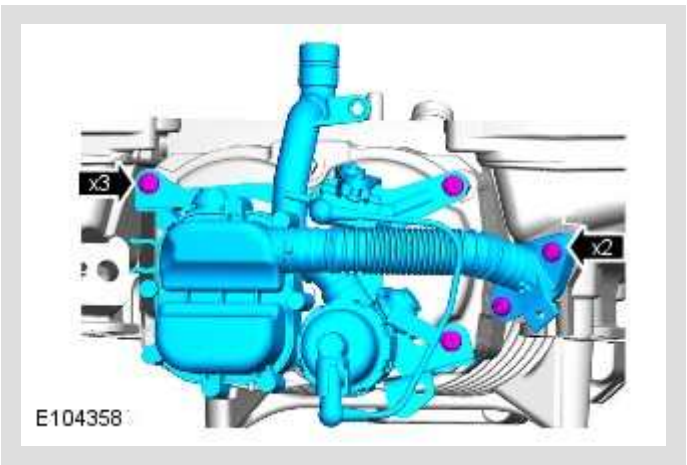
2.

cardiagn.com



Torque: **25 Nm**

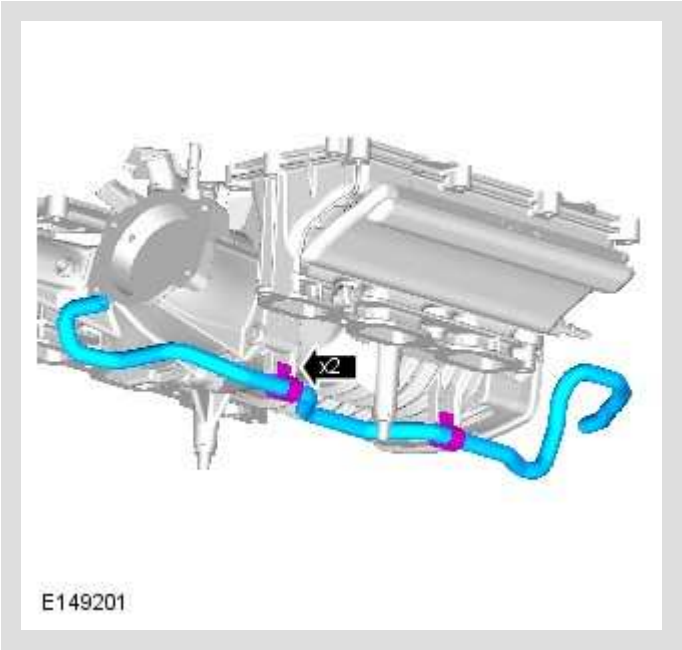
3.



Torque: **10 Nm**

4.

cardiagn.com



5.

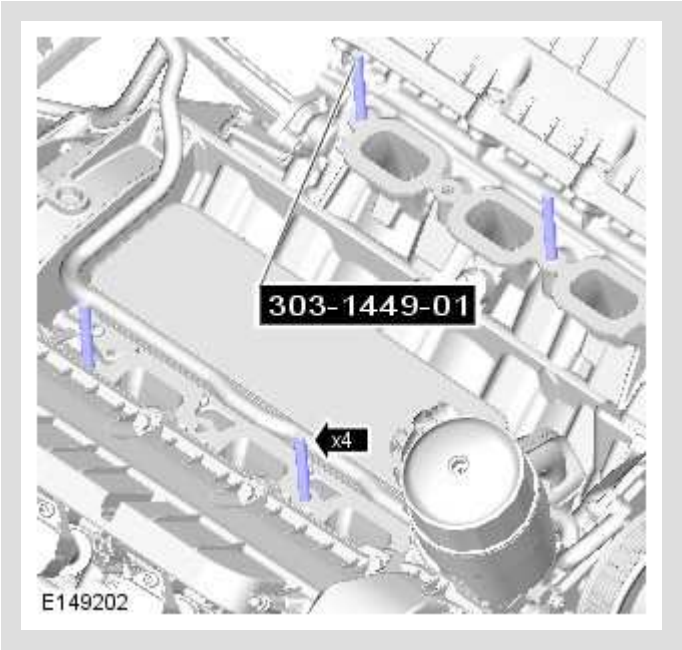
CAUTIONS:

- If a new cylinder head has been installed then the special tool 303-1449-02 without the thread must be used to install the supercharger.
- If a new cylinder head has been installed, then new taptite bolts must be used to install the supercharger.

NOTE:

New taptite bolts when used cut their own threads on the first application.

cardiagn.com



Special Tool(s): 303-1449-01 , 303-1449-02

6.

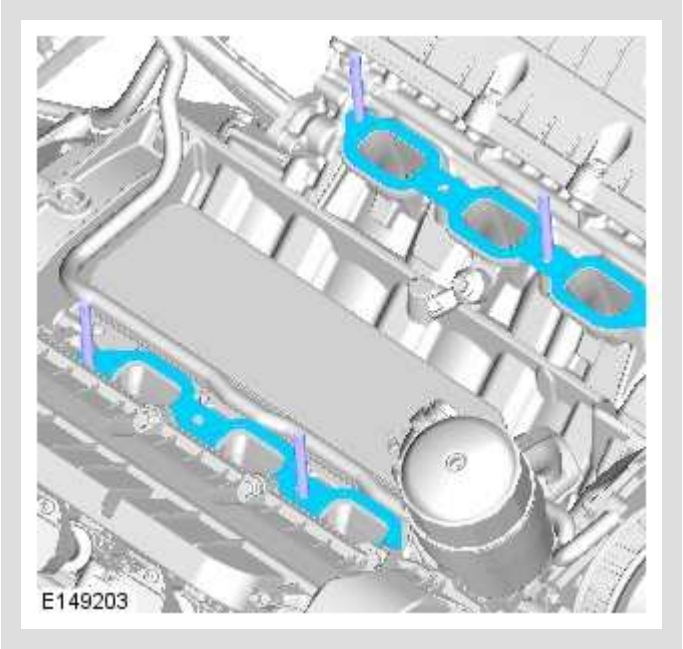
CAUTION:

Make sure that the mating faces are clean and free of foreign material.

NOTE:

Install new gaskets.

cardiagn.com

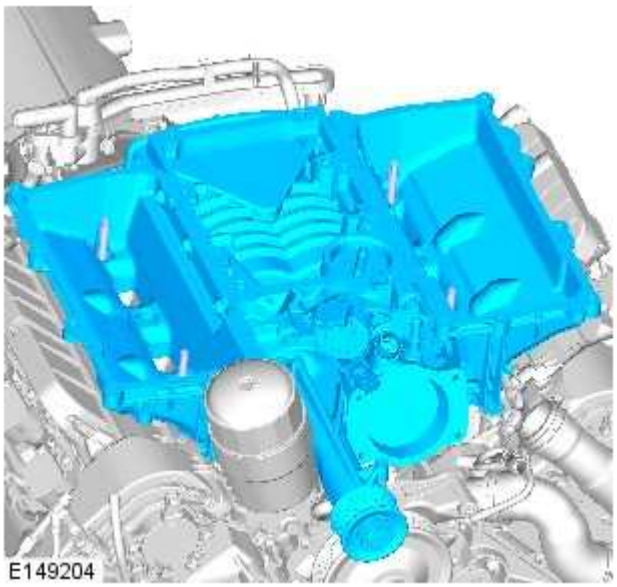


7.

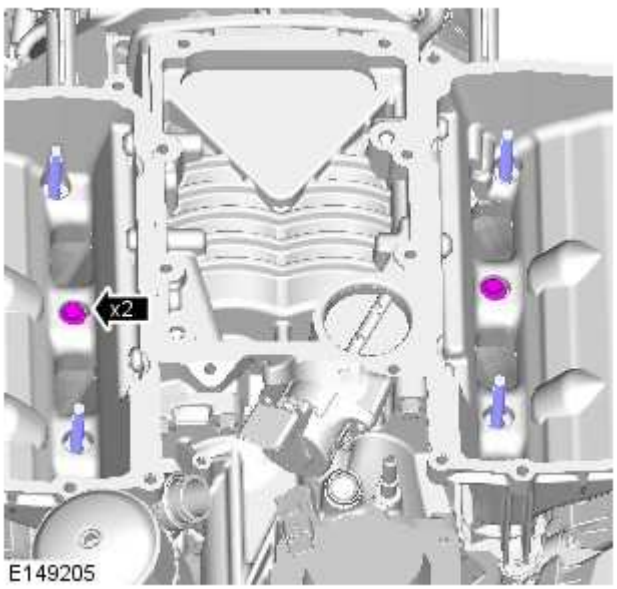
CAUTION:

Make sure that the mating faces are clean and free of foreign material.

cardiagn.com



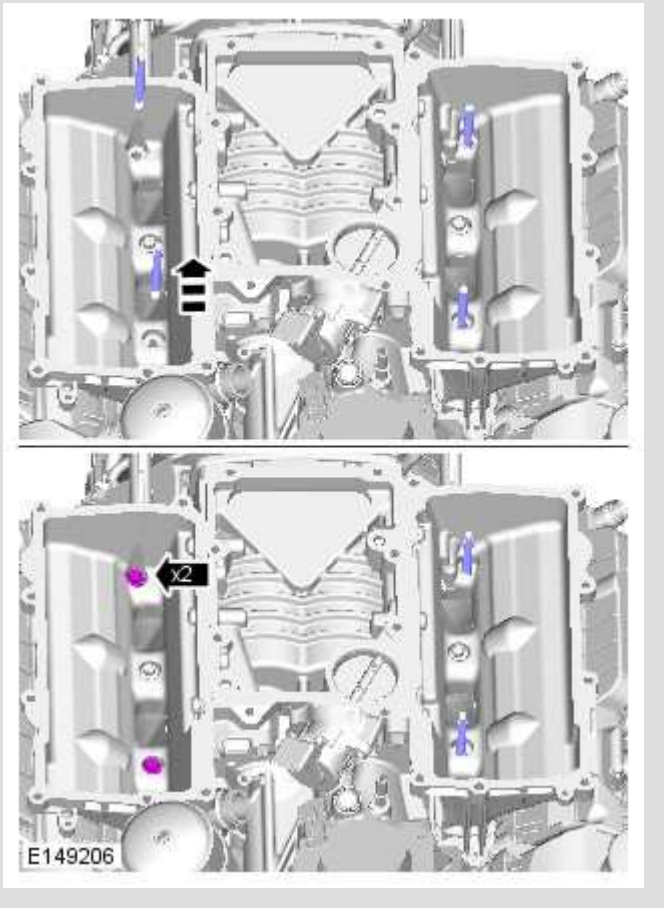
8.



cardiagn.com

Torque: **25 Nm**

9.

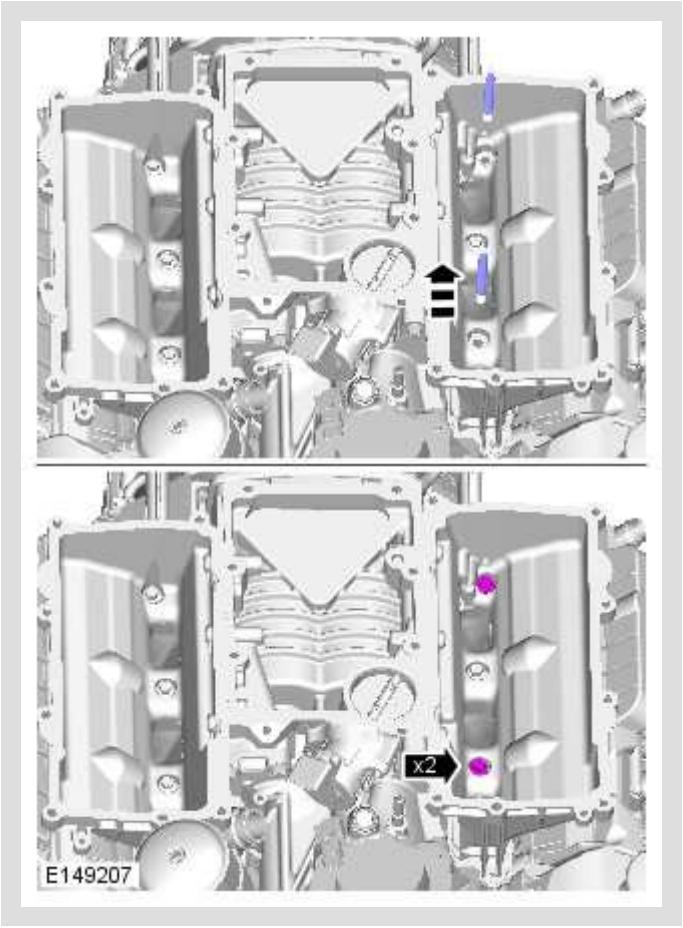


Special Tool(s): 303-1449-01 , 303-1449-02

Torque: **25 Nm**

10.

cardiagn.com

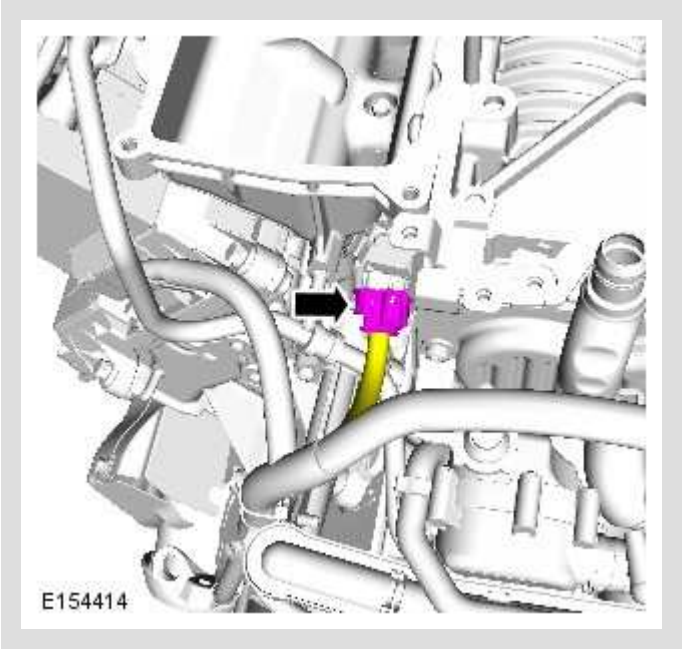


Special Tool(s): 303-1449-01 , 303-1449-02

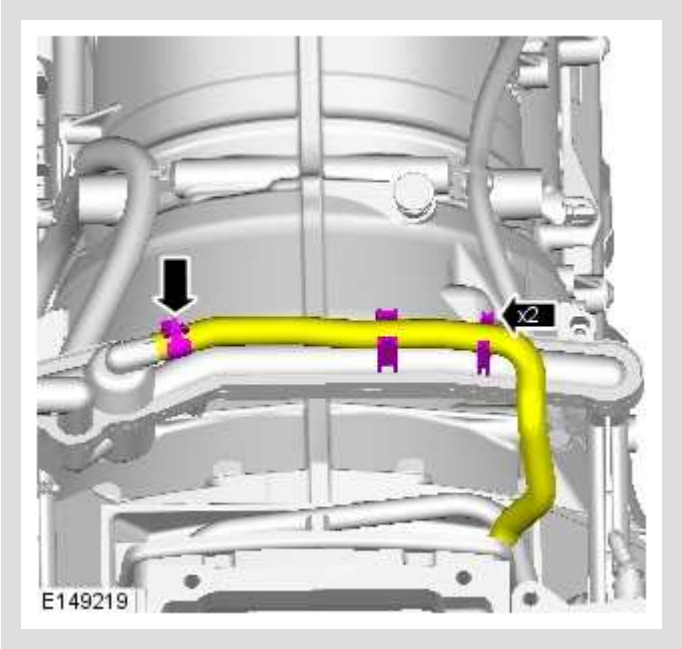
Torque: **25 Nm**

11.

cardiagn.com

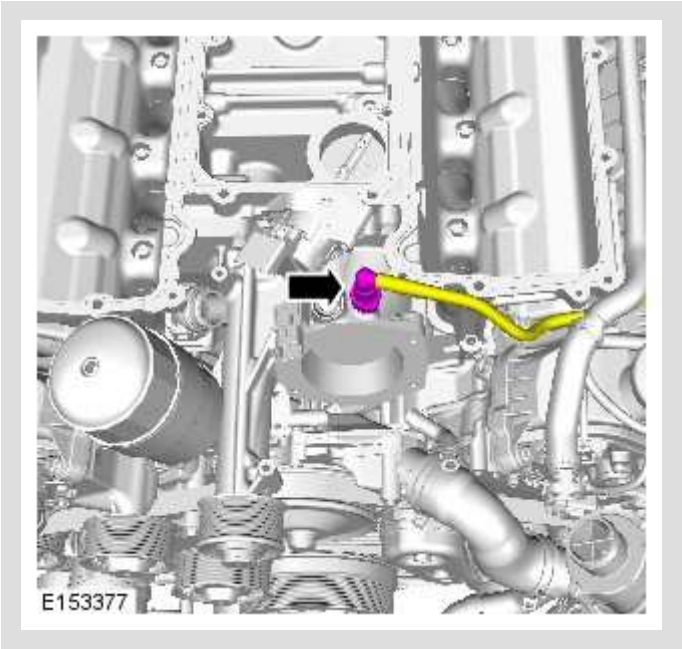


12.

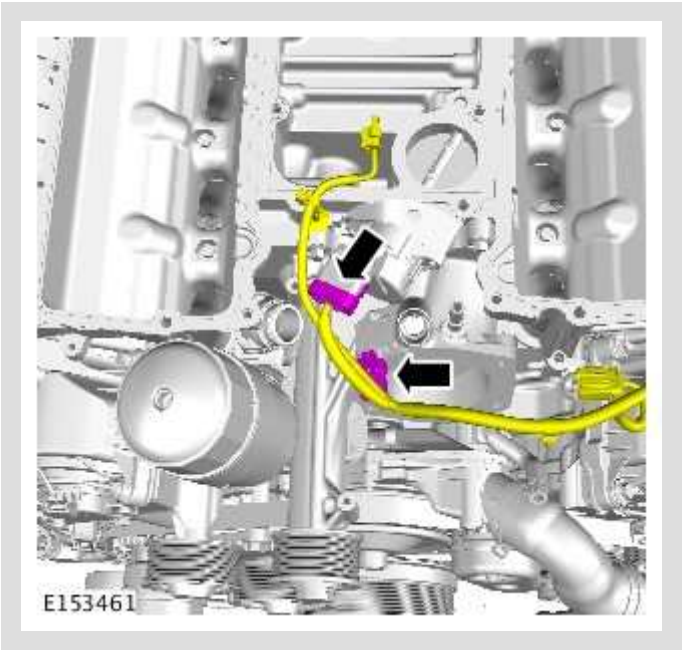


13.

cardiagn.com



14.



15.

cardiagn.com

Refer to: Supercharger Belt (303-05B Accessory Drive - V8 S/C 5.0L Petrol, Removal and Installation).

16. Refer to: Throttle Body (303-04B Fuel Charging and Controls - V8 S/C 5.0L Petrol, Removal and Installation).

17. Refer to: Charge Air Cooler (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

18. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

FUEL CHARGING AND CONTROLS - V6 S/C 3.0L PETROL

FUEL RAIL LH (G1584467)

REMOVAL AND INSTALLATION

19.60.05	FUEL RAIL - LEFT HAND - RENEW	3000 CC, AJ V6 (AJ126)	2.5	USED WITHINS	

SPECIAL TOOL(S)

cardiagn.com

303-1450

Spark Plug Remover /Installer

E115268

310-197

Remover, Fuel Injector

E114526

310-198

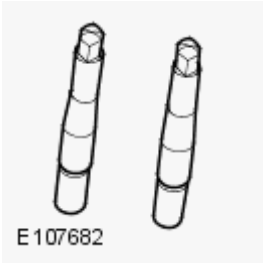
Installer, Teflon Seal

E107680

cardiagn.com

	310-199 Re-shape Tool, Teflon Seal

	310-200-01 Fuel Rail Installation Guide Pins - Threaded



REMOVAL

CAUTION:

Make sure that tools and equipment are clean and free of foreign material and lubricant.

cardiagn.com

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Fuel System Pressure Release (310-00 Fuel System - General Information, General Procedures).

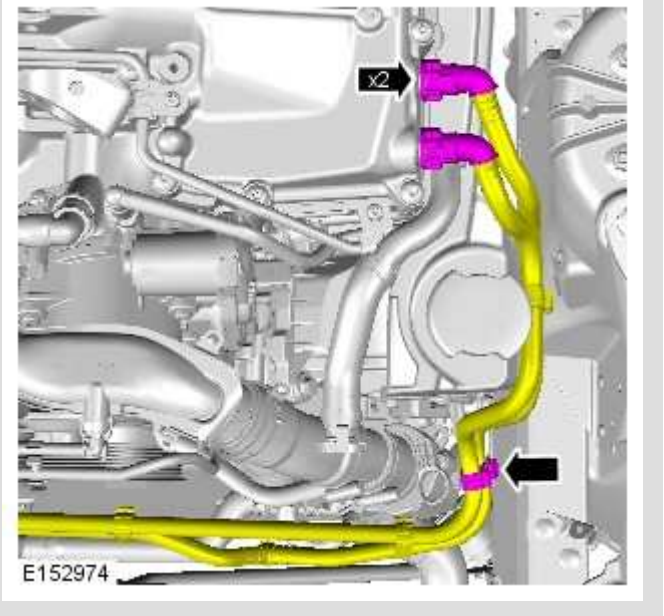
2. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

3. Refer to: Secondary Bulkhead Panel LH (501-02 Front End Body Panels, Removal and Installation).

4. Refer to: Fuel Injection Component Cleaning (303-04B Fuel Charging and Controls - V8 S/C 5.0L Petrol, General Procedures).

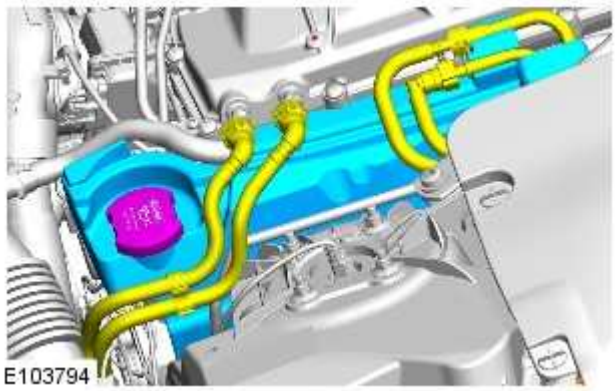
5. **CAUTION:**

   Be prepared to collect escaping fluids.

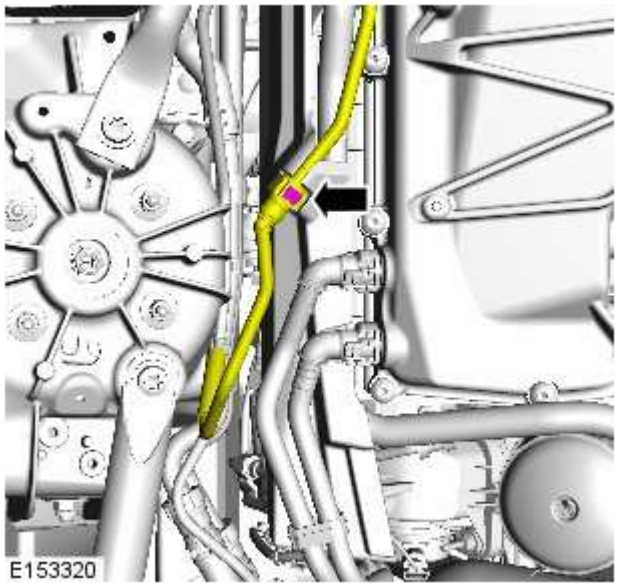


cardiagn.com

6.



7.

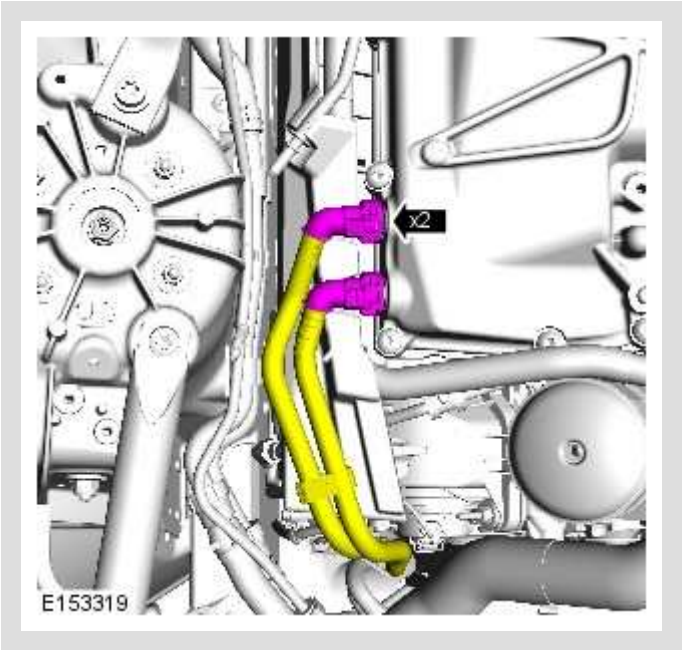


8.

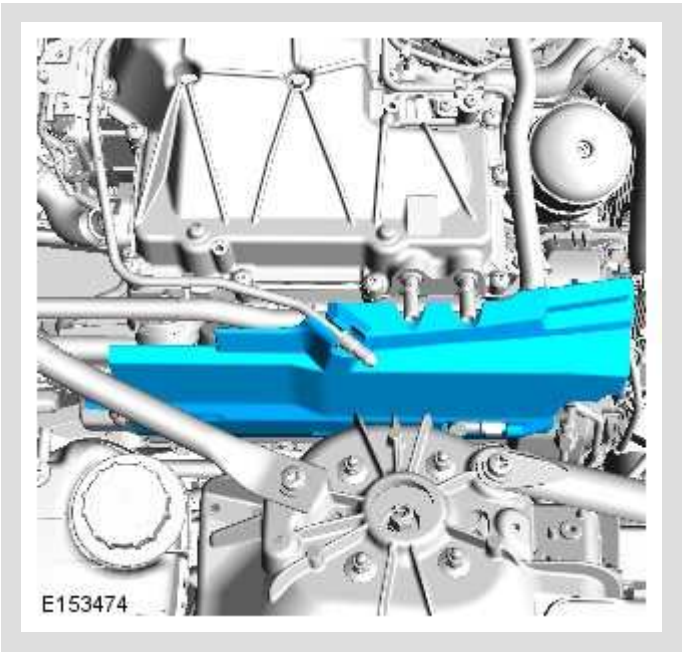
CAUTION:

Be prepared to collect escaping fluids.

cardiagn.com



9.

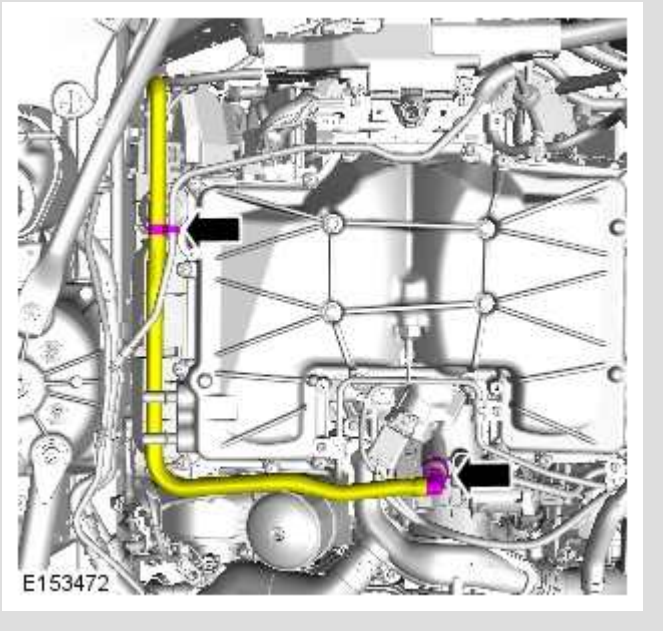


10.

CAUTION:

cardiagn.com

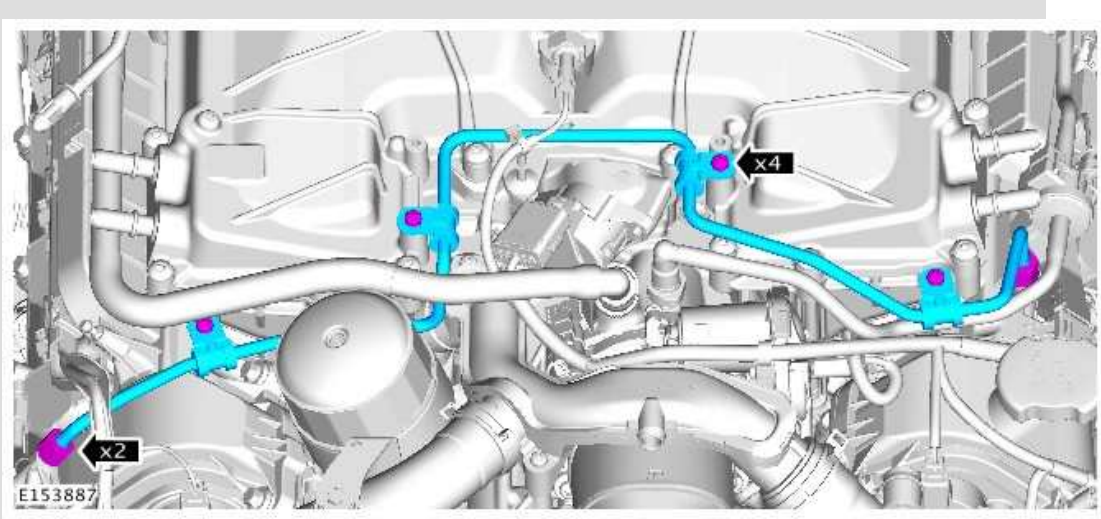
Be prepared to collect escaping fluids.



11.

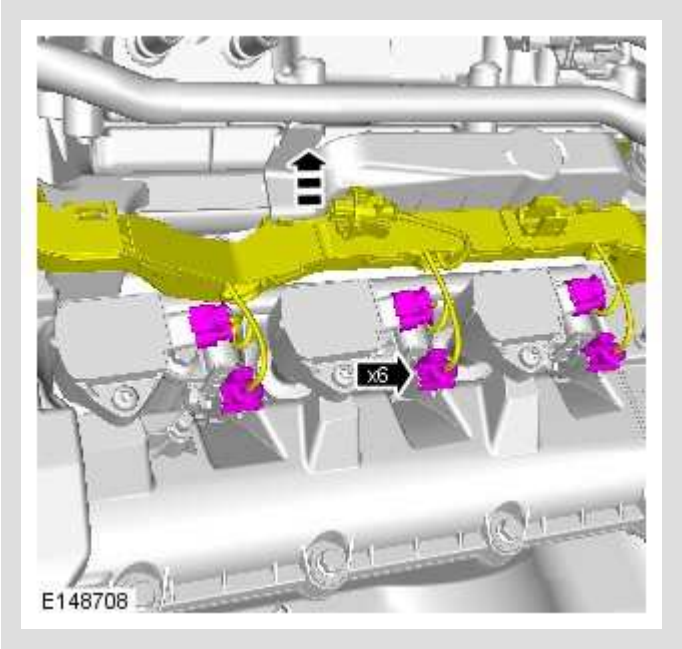
CAUTIONS:

- Be prepared to collect escaping fluids.
- Make sure that all openings are sealed. Use new blanking caps.

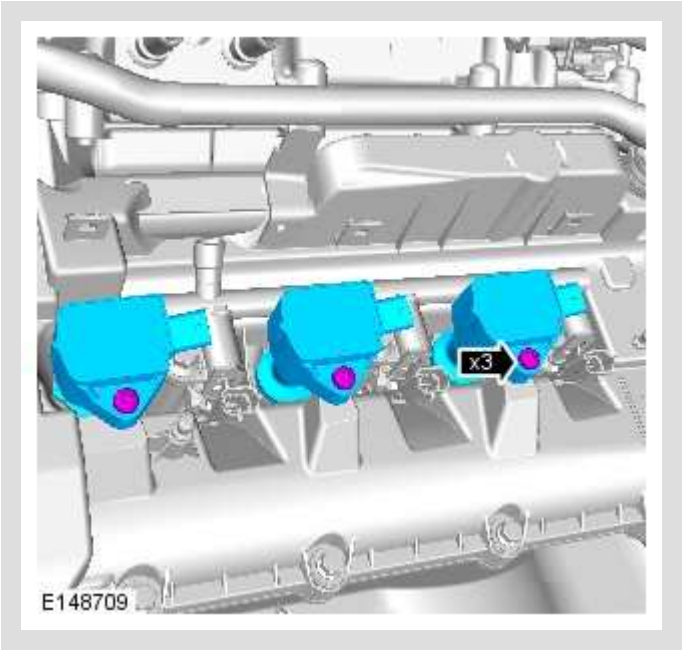


12.

cardiagn.com



13.

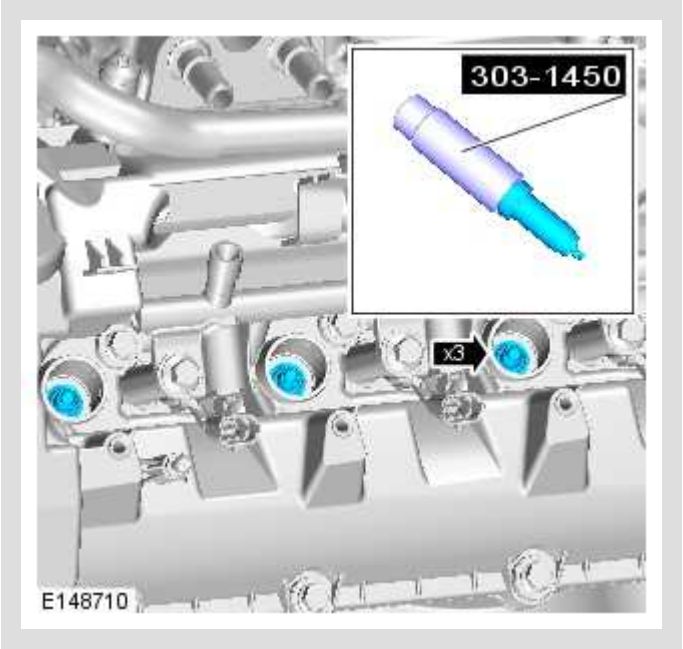


14.

NOTE:

RH illustration shown, LH is similar.

cardiagn.com

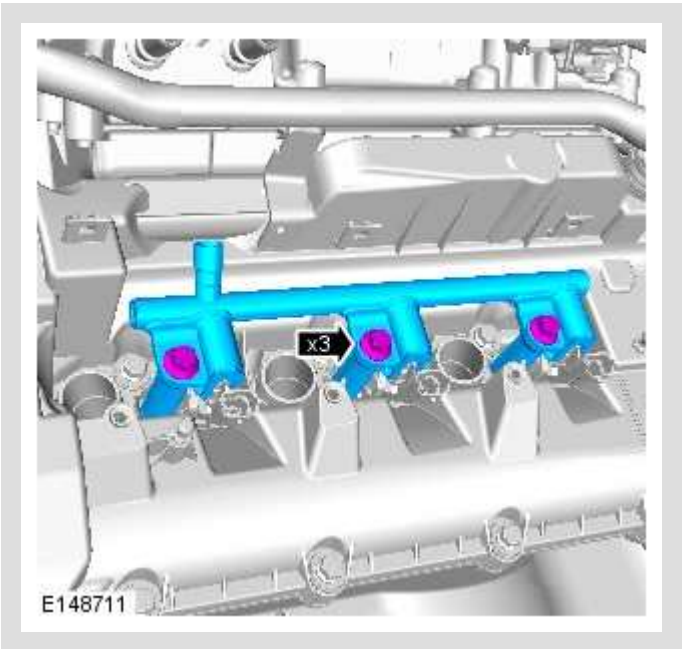


Special Tool(s): 303-1450

15.

CAUTION:

Make a note of the fuel injector clamp alignment to the fuel rail prior to removal.



16.

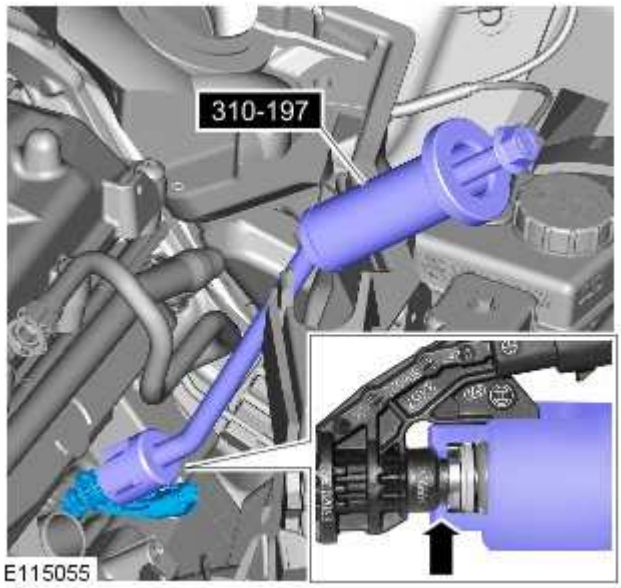
cardiagn.com

CAUTIONS:

- Make sure that the special tool is located correctly to the fuel injector prior to removing the fuel injector.
- Make sure that the special tool is held square to the fuel injector during removal.
- Make sure that all open ports are covered to prevent any foreign material ingress.

NOTE:

RH illustration shown, LH is similar.



Special Tool(s): 310-197

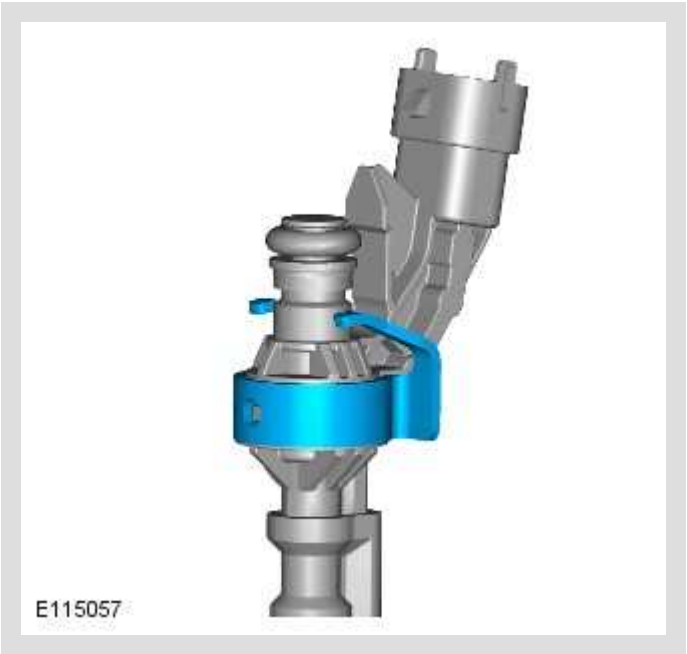
17.

CAUTIONS:

- If the fuel injector is being removed without a new component being installed, the fuel injector clamp must remain with the fuel injector it is removed with.

cardiagn.com

- If new fuel injectors are installed, a new injector clamp must be installed.



18.

CAUTIONS:

- Do not use a knife to remove the Teflon seal as damage could occur to the fuel injector.
- Do not cut the Teflon seal to deep as damage could occur to the fuel injector.
- Pinch the Teflon seal to allow the tool to cut the Teflon seal without damaging the fuel injector.

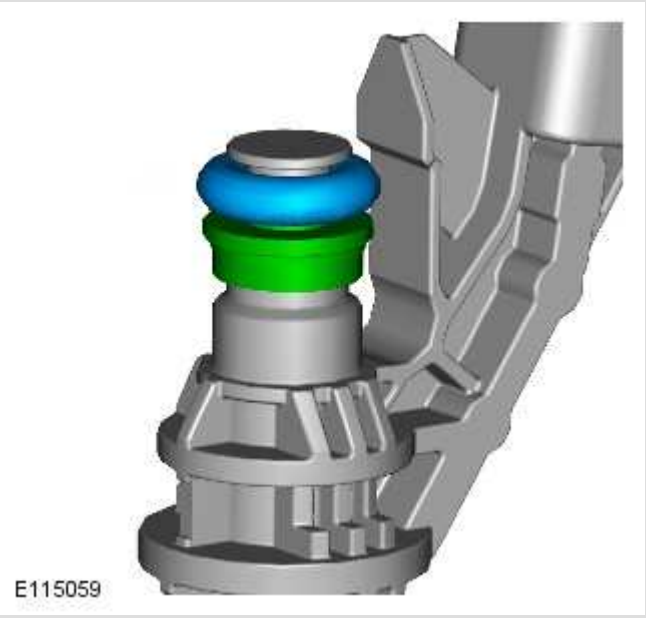
cardiagn.com

19.

CAUTION:

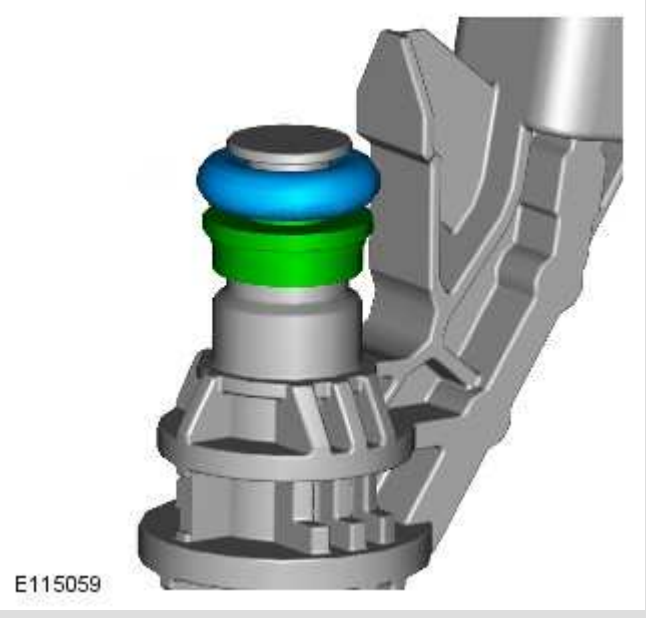
Do not use any sharp tools to remove the O-ring seal as damage could occur to the fuel injector.

cardiagn.com



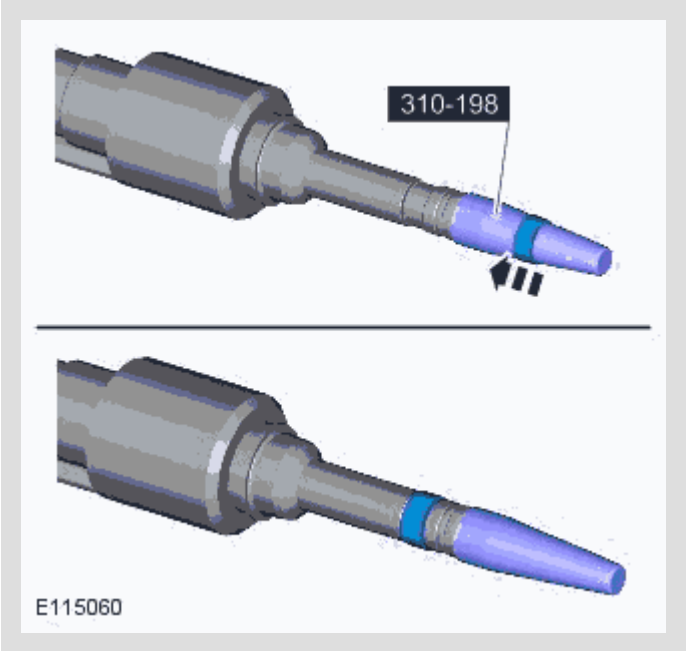
INSTALLATION

1.



cardiagn.com

2.



Special Tool(s): 310-198

3.

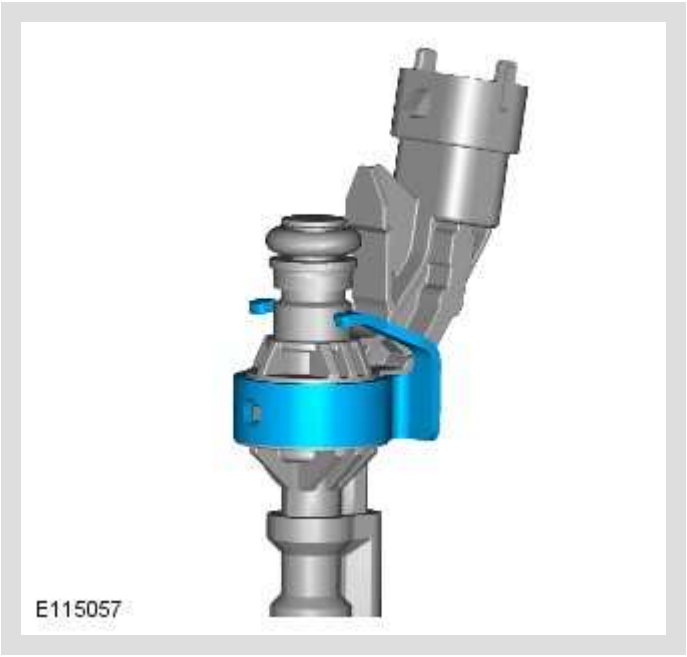
Special Tool(s): 310-199

4.

CAUTION:

If the original fuel injector is being installed, the original fuel injector clamp must installed with the fuel injector it was removed with.

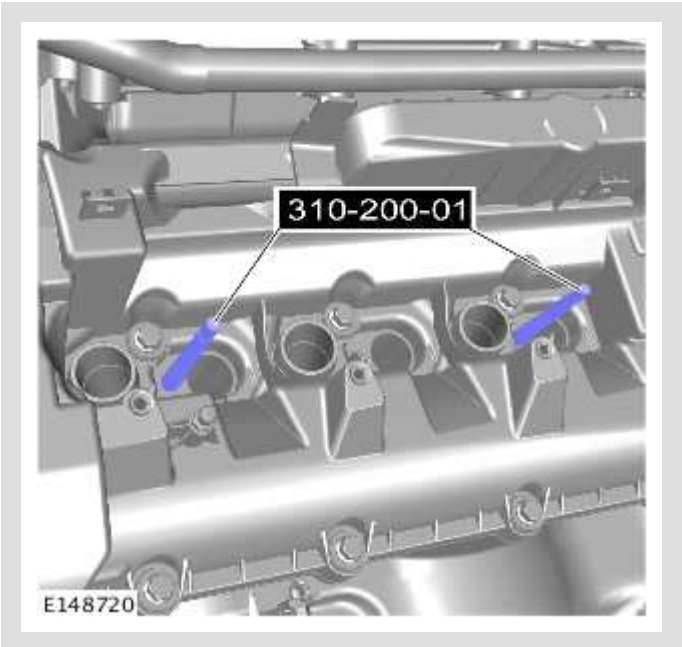
cardiagn.com



5.

CAUTION:

If a new cylinder head has been installed then the special tool 310-200-02 without the thread must be used to install the fuel rail.



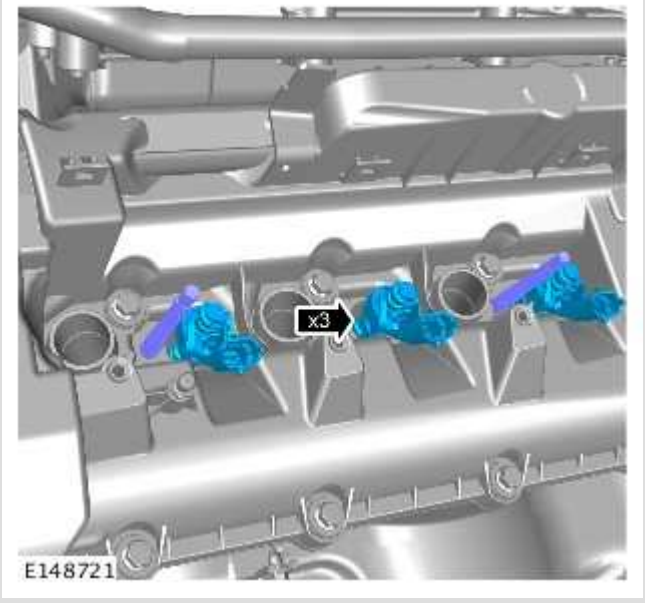
Special Tool(s): 310-200-01

6.

CAUTIONS:

cardiagn.com

- Make sure that the area around the open fuel injector ports are clean and free of foreign material and lubricant prior to installing the fuel injector.
- When installing the fuel injector(s), make sure that the Teflon seal is clean and free of foreign material and lubricant.



7.

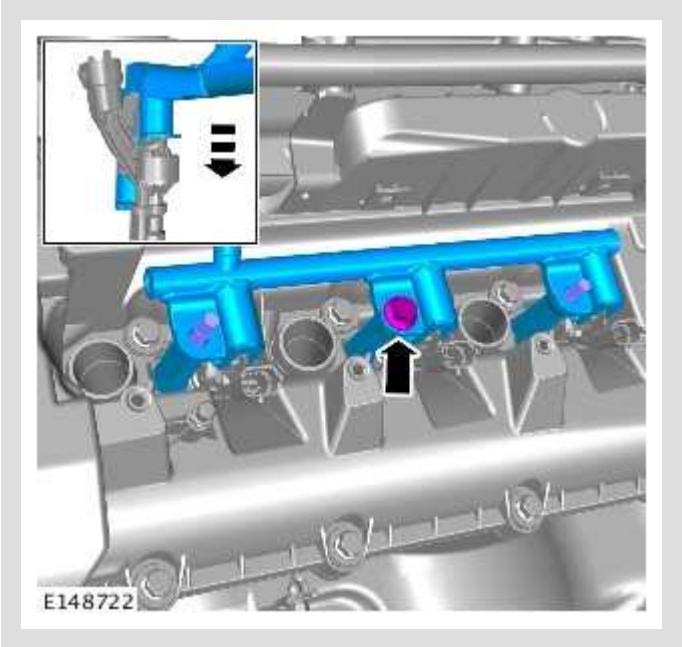
CAUTIONS:

- If new fuel injectors are installed, a new injector clamp must be installed.
- Make sure that the fuel injector is aligned and installed into the fuel rail correctly, as noted in the removal step.
- Tighten the fuel rail retaining bolts a turn at a time until the correct torque is achieved.

NOTE:

cardiagn.com

Lubricate the fuel injector O-ring seals with clean engine oil.



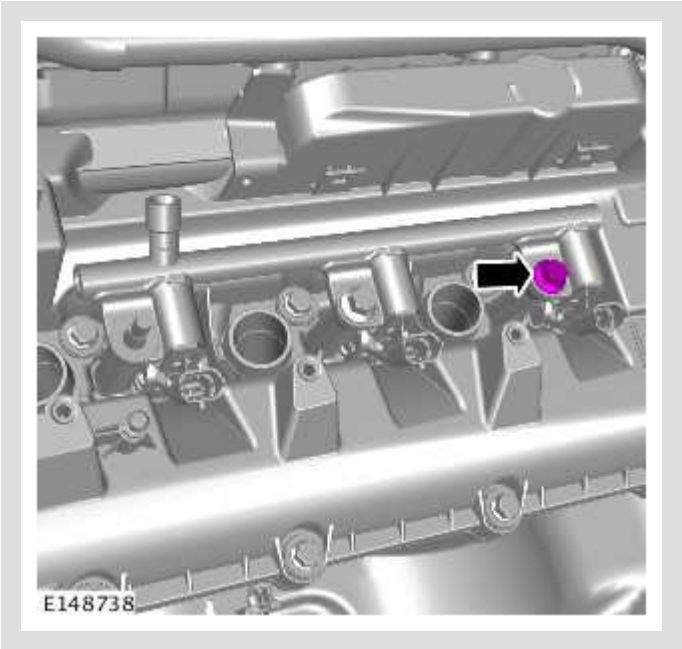
Torque: **20 Nm**

8.

Special Tool(s): 310-200-01

9.

cardiagn.com



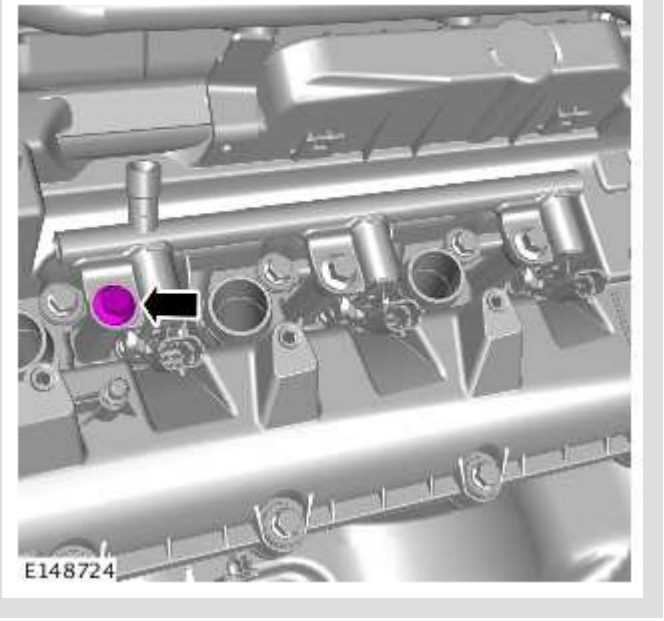
Torque: **20 Nm**

10.

Special Tool(s): 310-200-01

11.

cardiagn.com

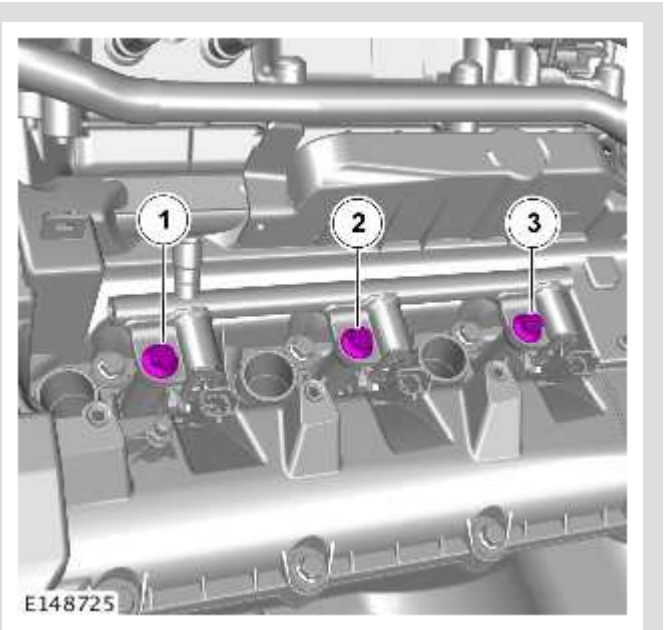


Torque: **20 Nm**

12.

NOTE:

Tighten the bolts in the indicated sequence.



cardiagn.com

Torque:

Bolt 2 **30 Nm**

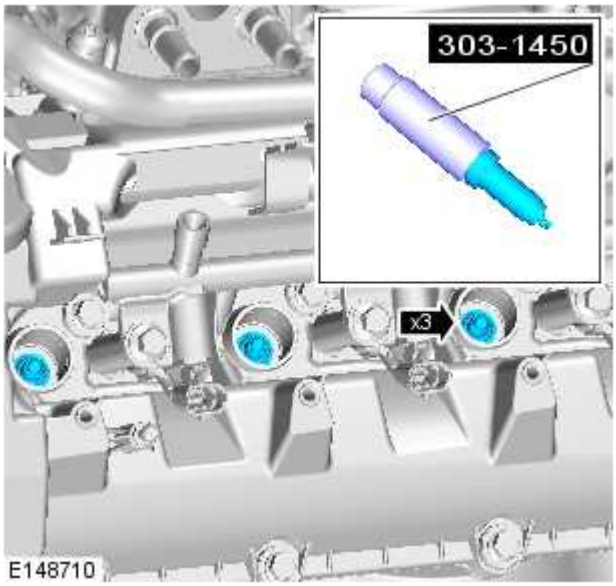
Bolt 3 **30 Nm**

Bolt 1 **30 Nm**

13.

NOTE:

RH illustration shown, LH is similar.

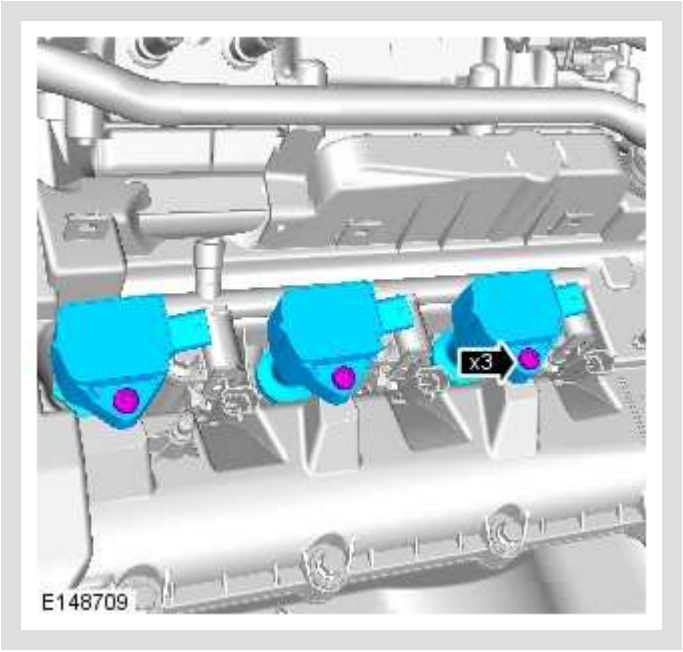


Special Tool(s): 303-1450

Torque: **22 Nm**

14.

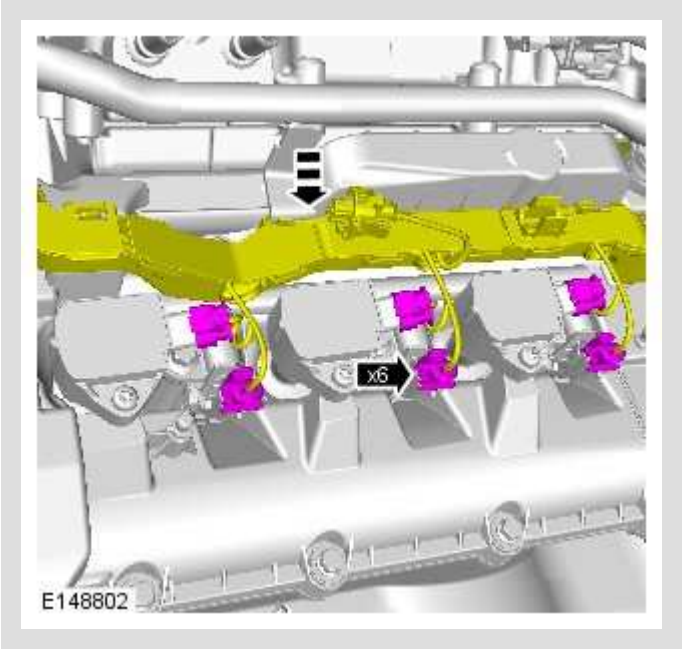
cardiagn.com



Torque: **7 Nm**

15.

cardiagn.com



16.

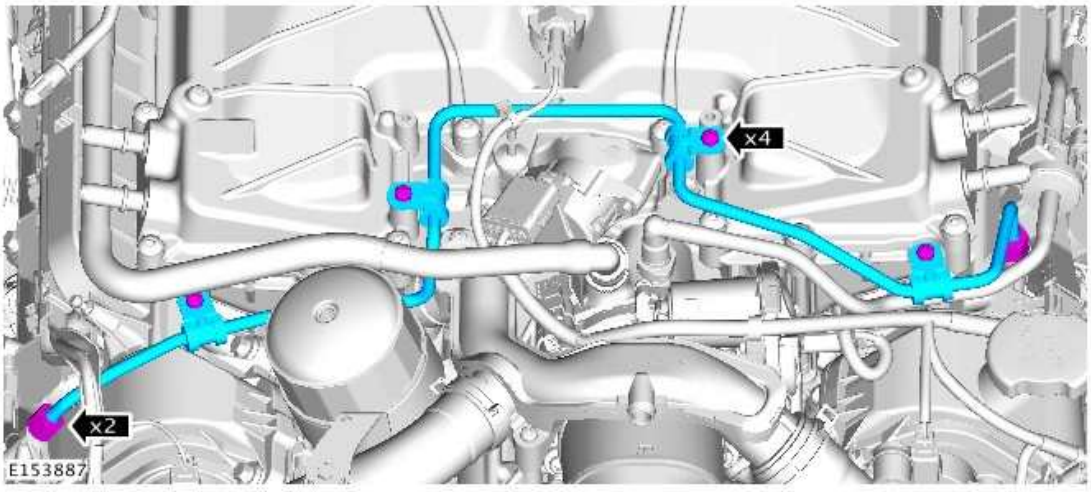
CAUTION:

Lubricate only the union threads with clean engine oil.

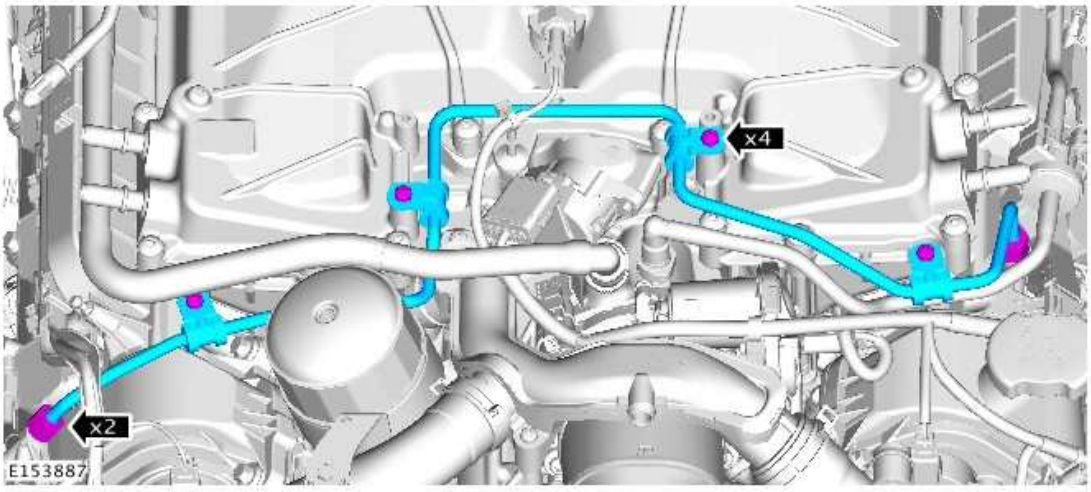
NOTES:

- Do not tighten at this stage.
- Remove and discard the blanking caps.

cardiagn.com



17.



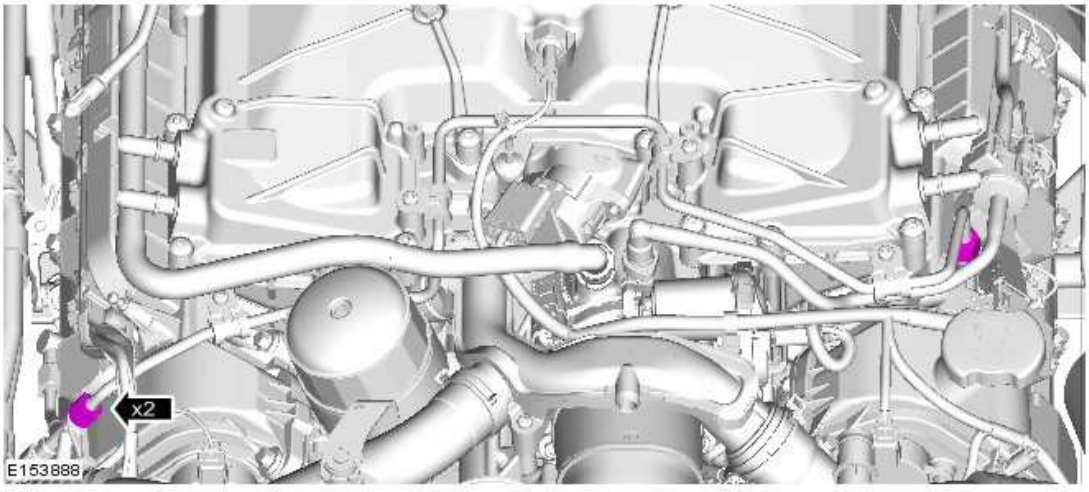
Torque:

Unions **21 Nm**

Bolts **8 Nm**

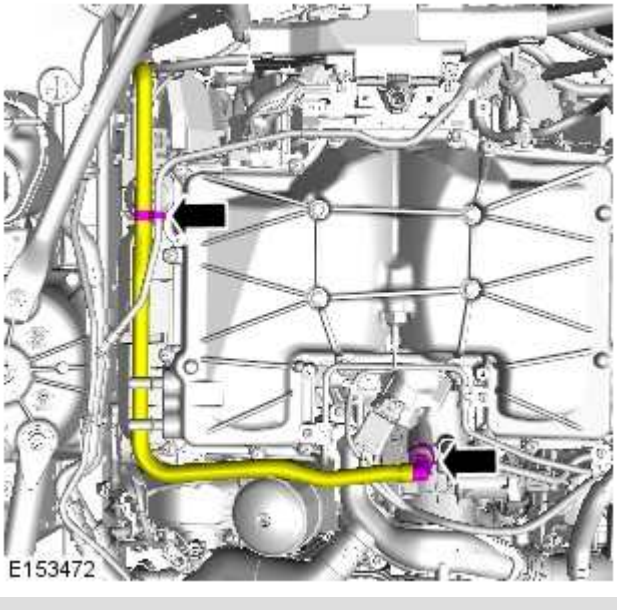
18.

cardiagn.com



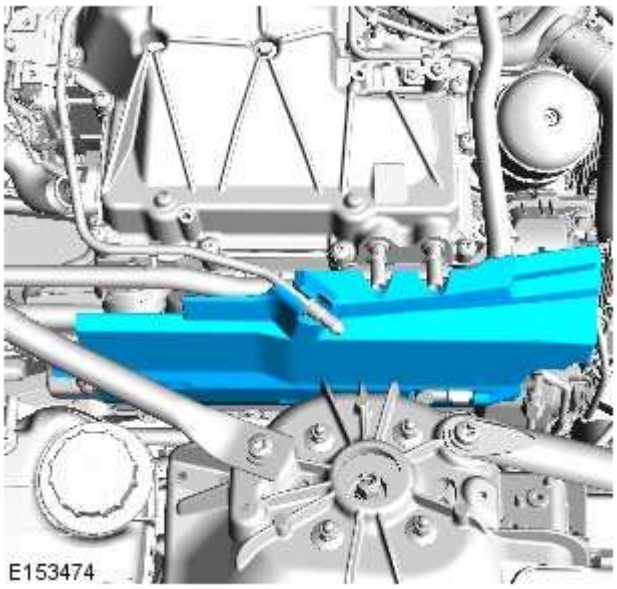
Torque: **21 Nm**

19.

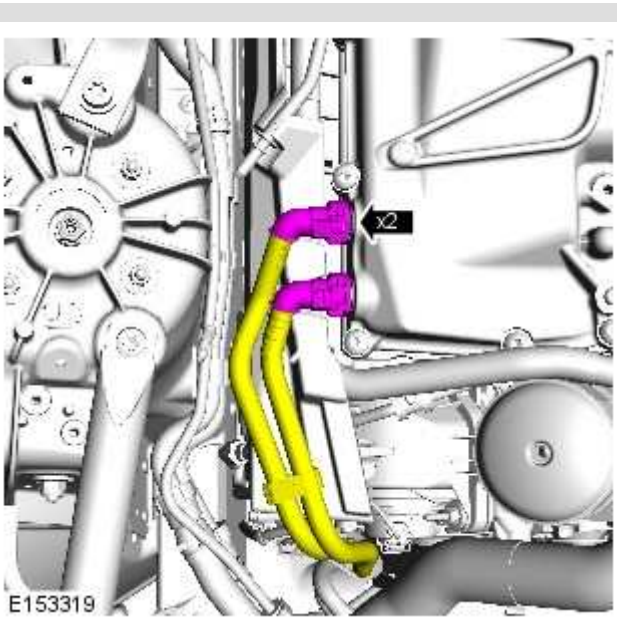


20.

cardiagn.com

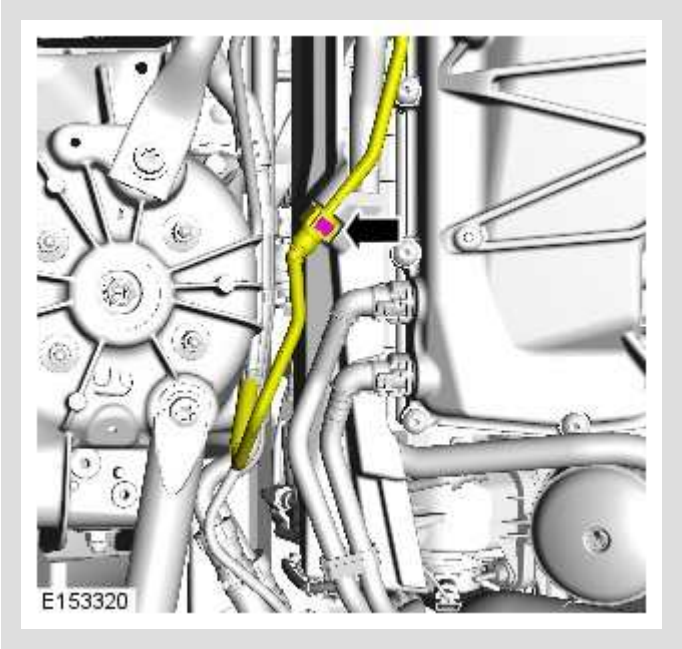


21.

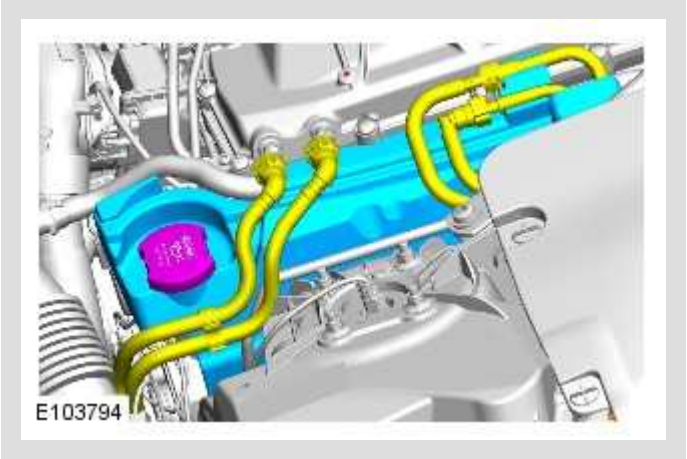


22.

cardiagn.com

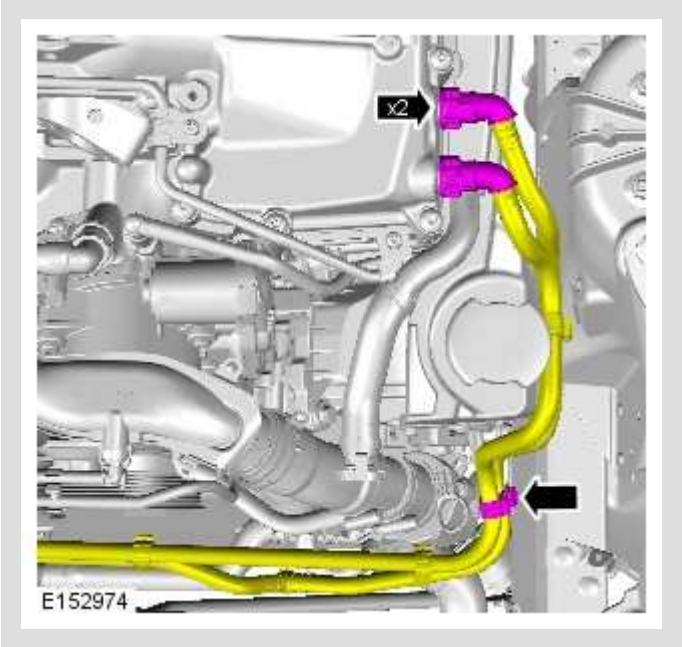


23.



24.

cardiagn.com



25. Refer to: Secondary Bulkhead Panel LH (501-02 Front End Body Panels, Removal and Installation).

26. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

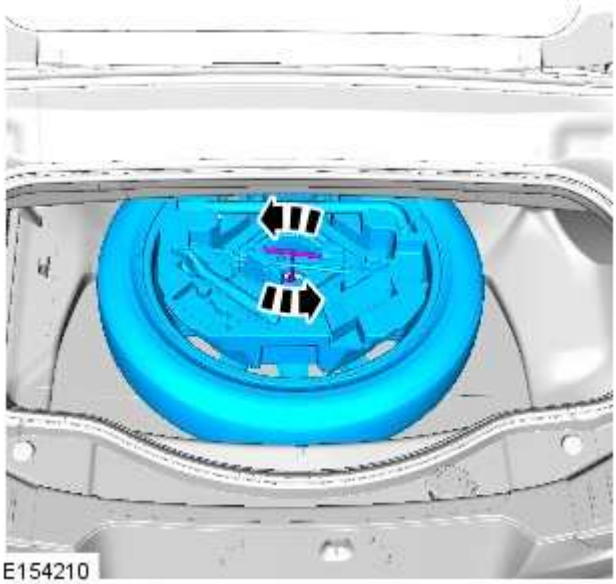
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

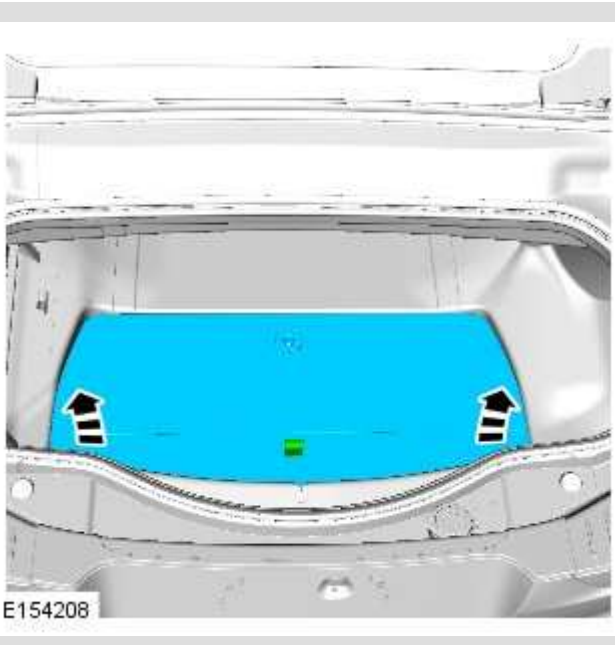
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

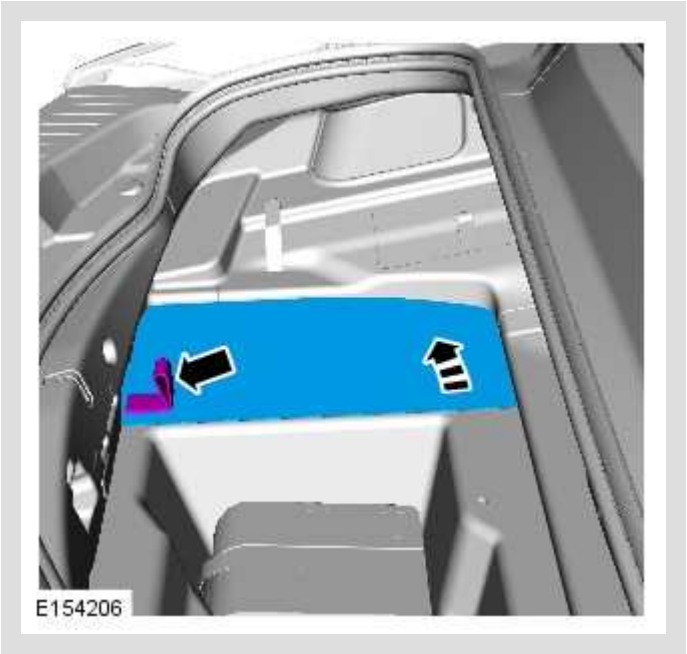


4.



cardiagn.com

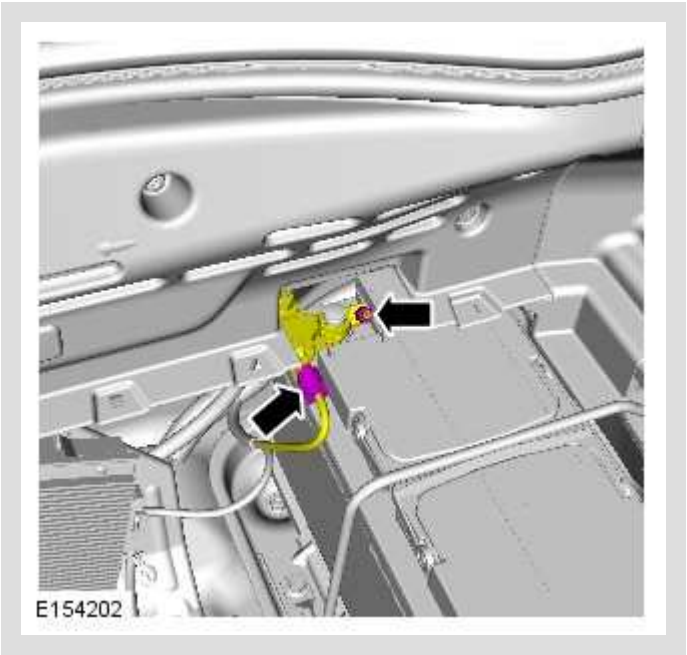
5.



6.

CAUTION:

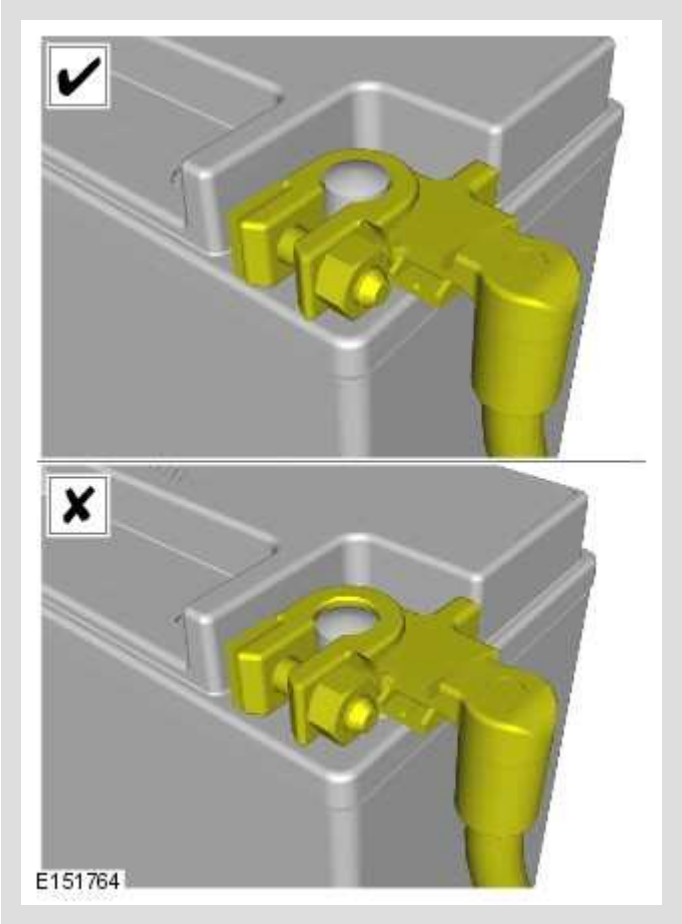
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

cardiagn.com

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

VALVE COVER RH (G1584121)

REMOVAL AND INSTALLATION

12.29.44	CAMSHAFT COVER - RIGHT HAND - RENEW	3000 CC, AJ V6 (AJ126)	6.5	USED WITHINS	

SPECIAL TOOL(S)

303-1446

Valve Cover Alignment Tool

REMOVAL

cardiagn.com

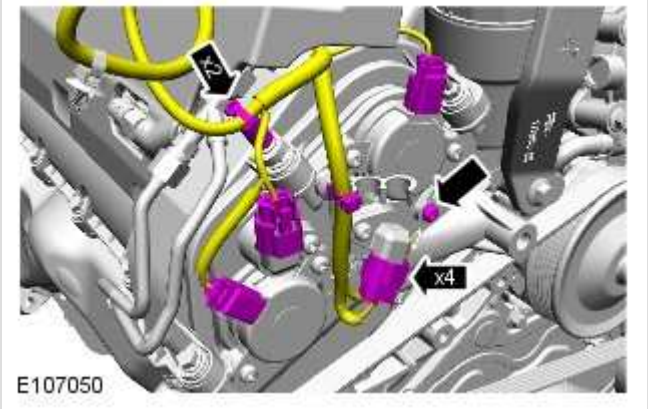
NOTES:

- Removal steps in this procedure may contain installation details.
- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. Refer to: Supercharger (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

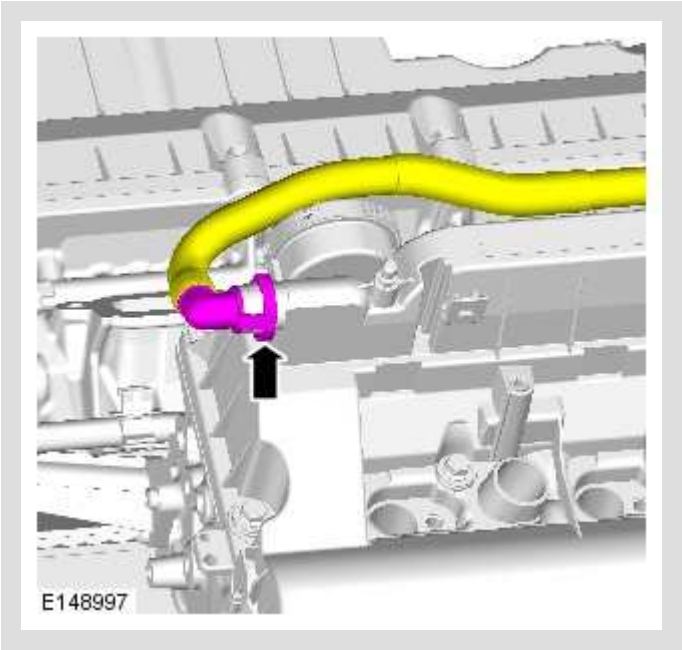
3. Refer to: Fuel Rail RH (303-04A Fuel Charging and Controls - V6 S/C 3.0L Petrol, Removal and Installation).

4. 

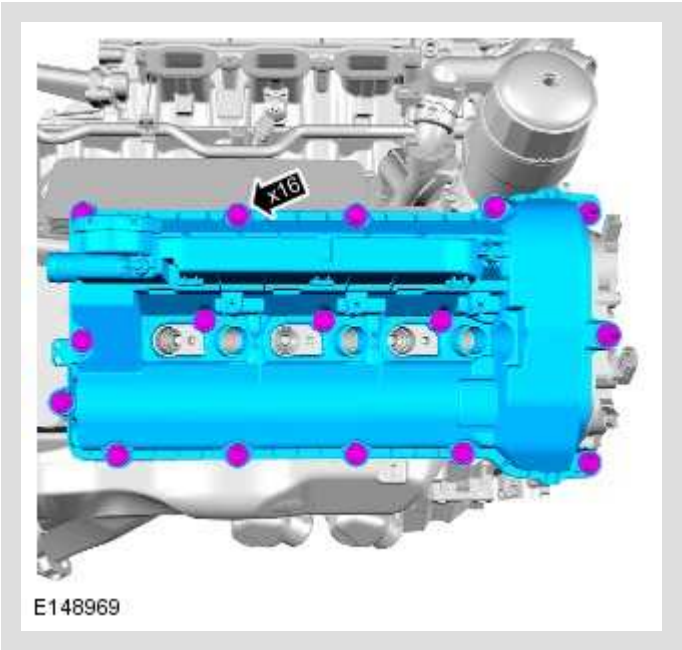
   Torque: **10 Nm**

5.

cardiagn.com



6.



INSTALLATION

cardiagn.com

1.

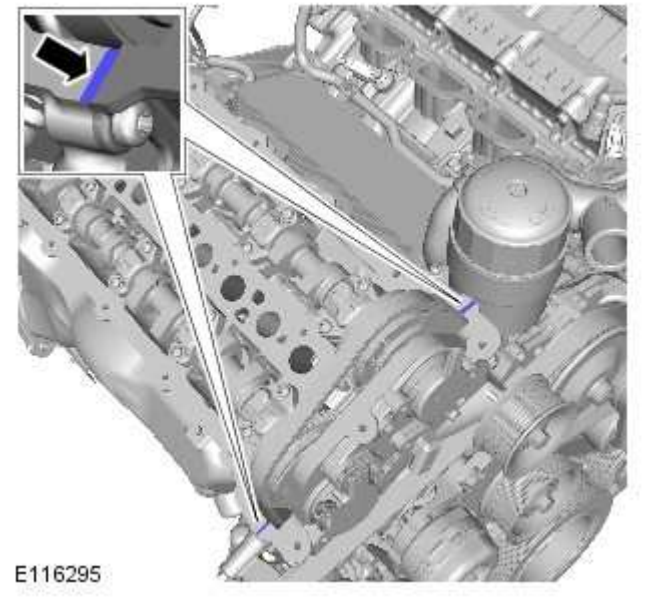
CAUTIONS:

- Use only a plastic scraper when removing the sealing material.
- Use lint free cloth.
- Make sure that the mating faces are clean and free of corrosion and foreign material.
- Installation of the valve cover and tightening must be carried out within 7 minutes of applying the sealant.

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Apply two beads of silcone gasket sealant (Loctite 5901G or Loctite 5900) as shown on the illustration. The application of the sealant must be 1.5mm diameter 12mm long. Install the valve cover immediately after applying the sealant. The cover should be fitted directly to the head without smearing the sealant or the seals.

cardiagn.com

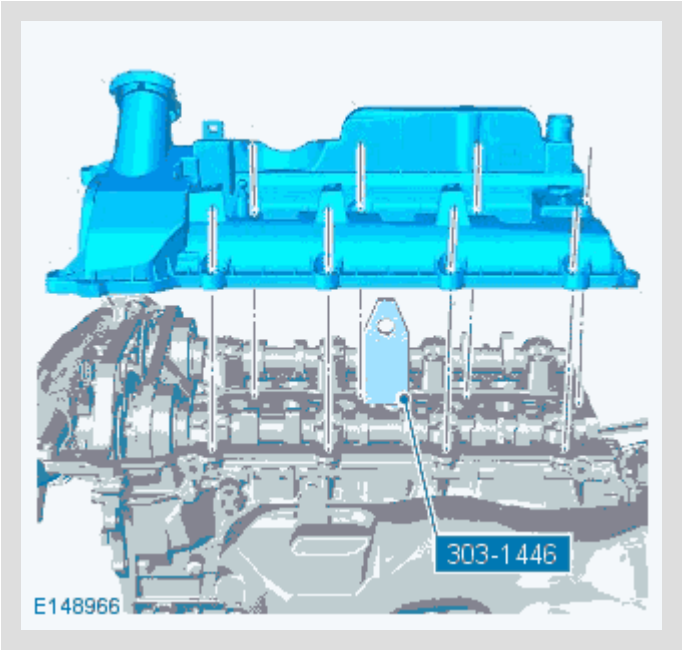


2.

NOTE:

LH illustration shown, RH is similar.

cardiagn.com



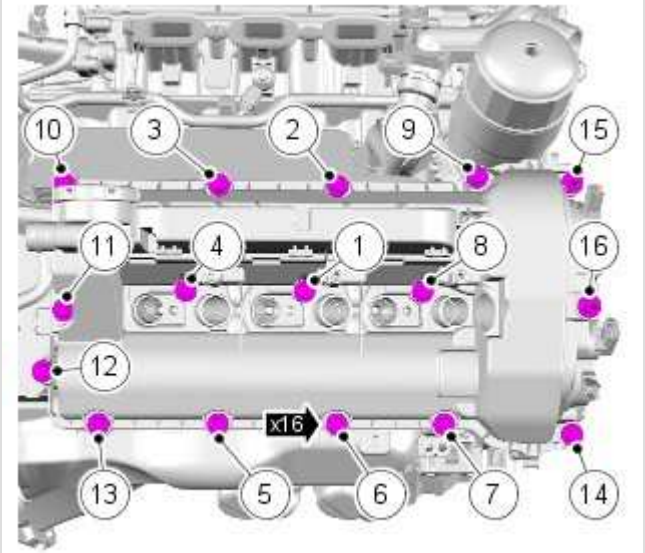
Special Tool(s): 303-1446

3.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com



E148981

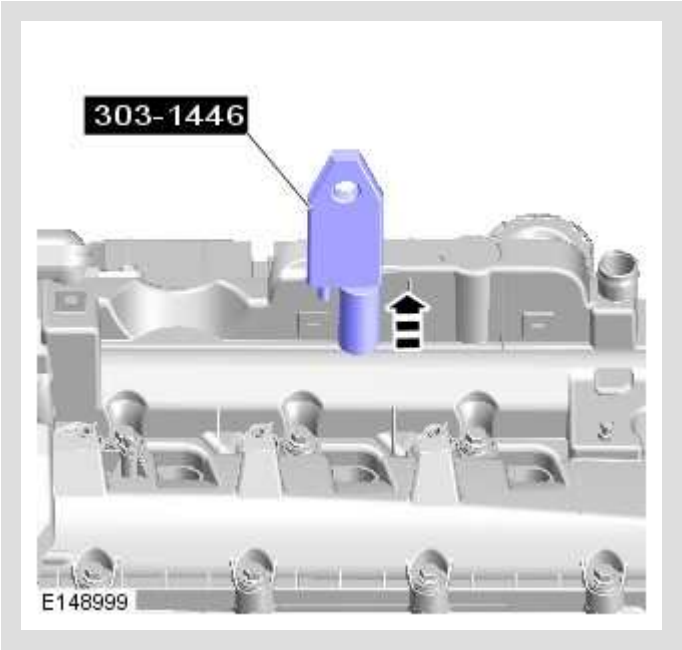
Torque: **13 Nm**

4.

NOTE:

LH illustration shown, RH is similar.

cardiagn.com



Special Tool(s): 303-1446

5. To install, reverse the removal procedure.

cardiagn.com

FUEL RAIL RH (G1584468)

REMOVAL AND INSTALLATION

19.60.04	FUEL RAIL - RIGHT HAND - RENEW	3000 CC, AJ V6 (AJ126)	3.6	USED WITHINS	

SPECIAL TOOL(S)

303-1450

Spark Plug Remover /Installer

310-197

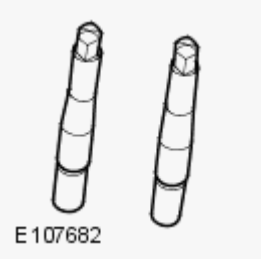
Remover, Fuel Injector

310-198

Installer, Teflon Seal

cardiagn.com

	310-199 Re-shape Tool, Teflon Seal

	**310-200-01** Fuel Rail Installation Guide Pins - Threaded

REMOVAL

CAUTION:

Make sure that tools and equipment are clean and free of foreign material and lubricant.

NOTE:

Removal steps in this procedure may contain installation details.

1.

cardiagn.com

Refer to: Fuel System Pressure Release (310-00 Fuel System - General Information, General Procedures).

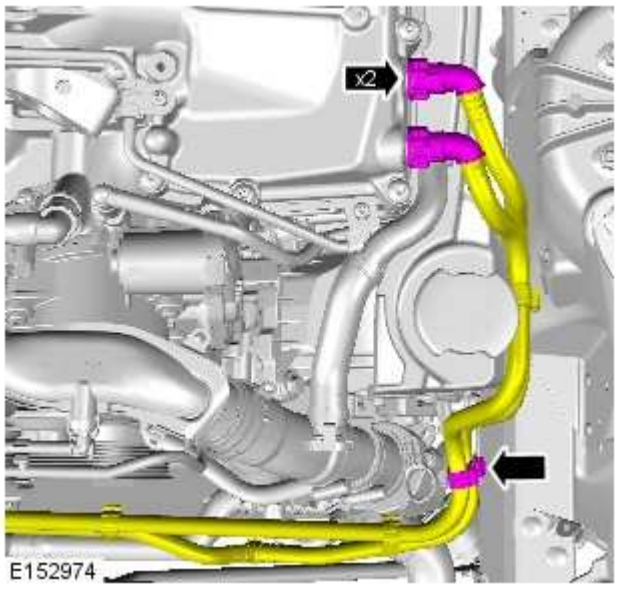
2. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

3. Refer to: Secondary Bulkhead Panel RH (501-02 Front End Body Panels, Removal and Installation).

4. Refer to: Fuel Injection Component Cleaning (303-04B Fuel Charging and Controls - V8 S/C 5.0L Petrol, General Procedures).

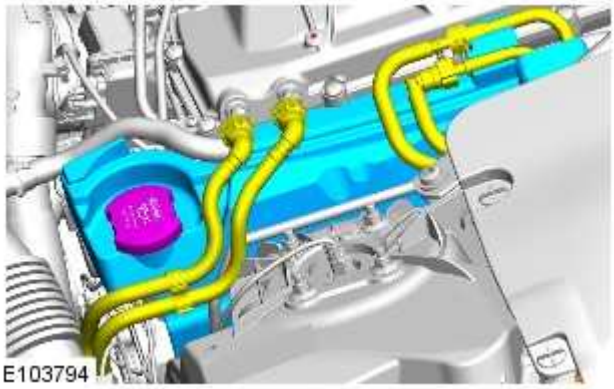
5. **CAUTION:**

Be prepared to collect escaping fluids.

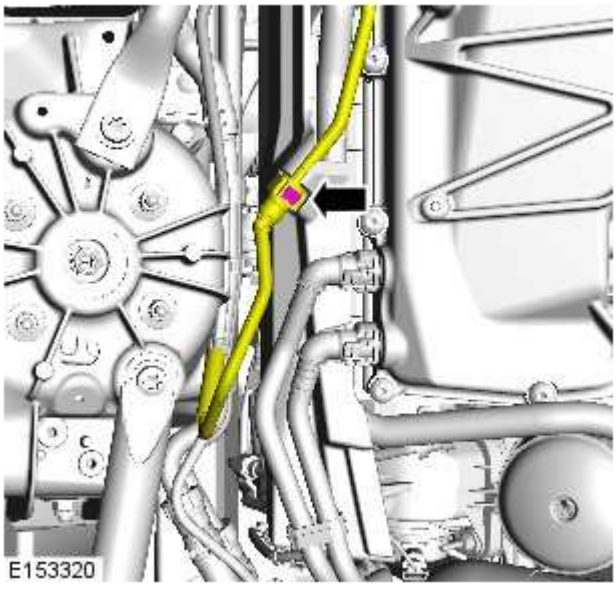


6.

cardiagn.com



7.

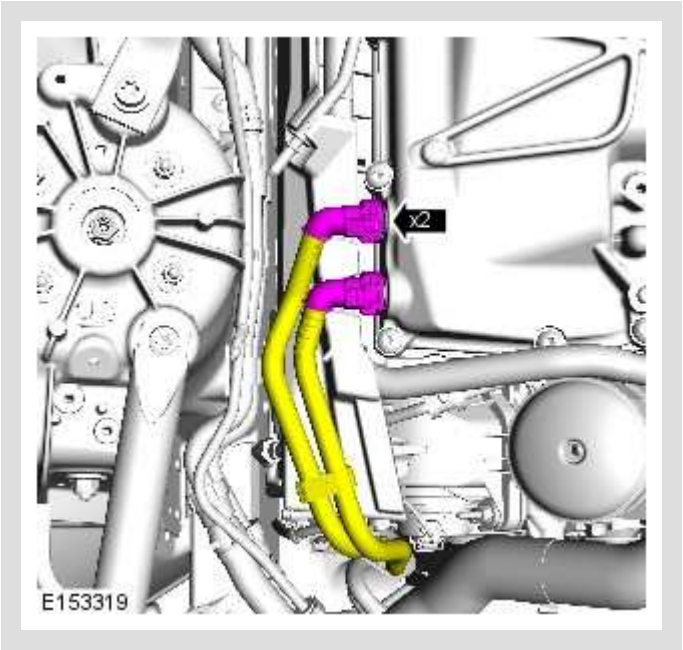


8.

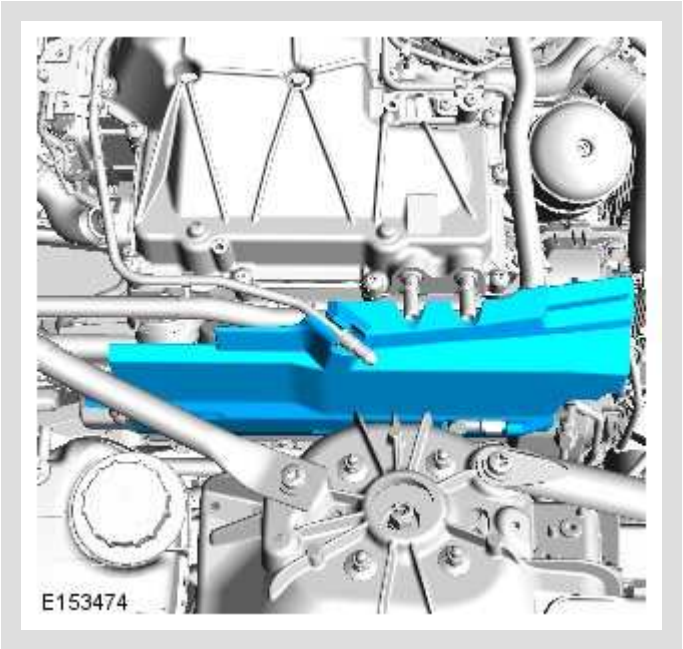
CAUTION:

Be prepared to collect escaping fluids.

cardiagn.com



9.



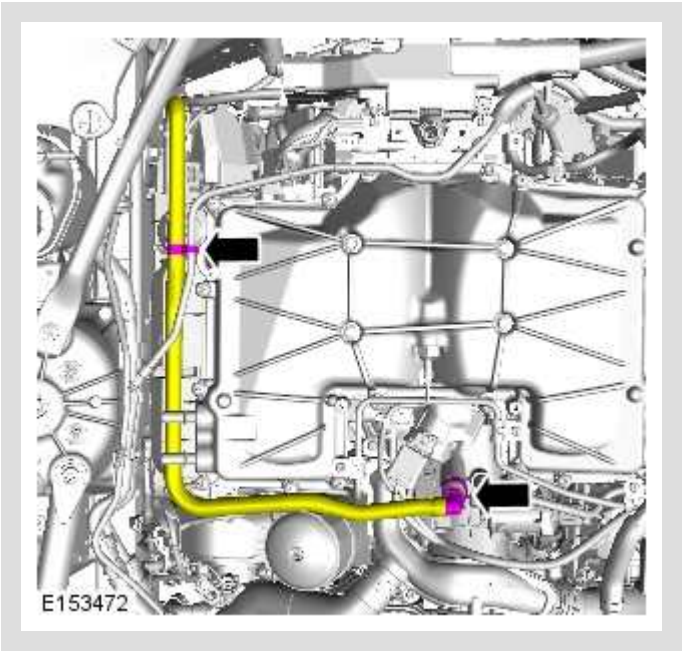
10. Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

11.

CAUTION:

Be prepared to collect escaping fluids.

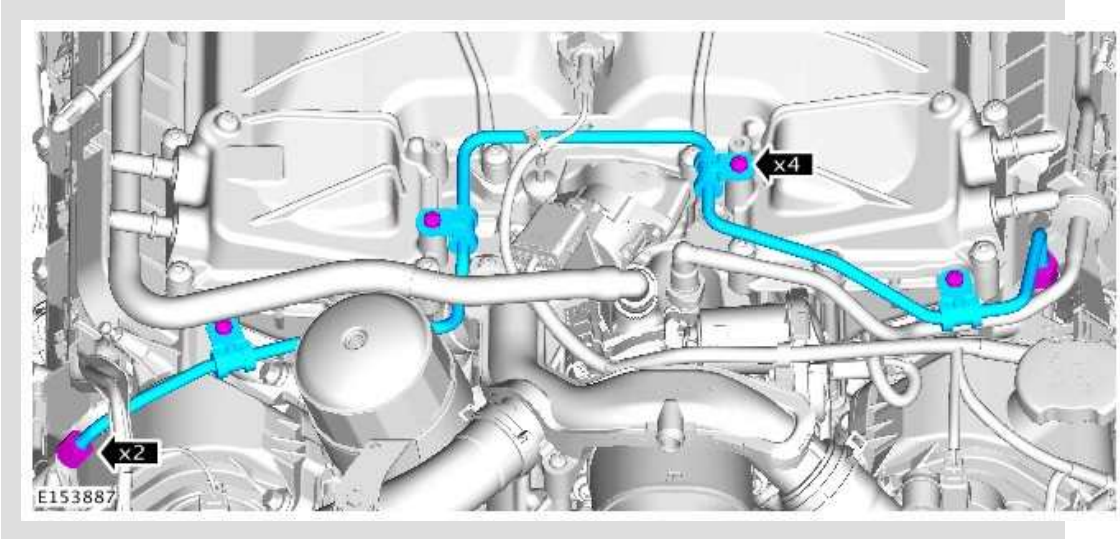
cardiagn.com



12.

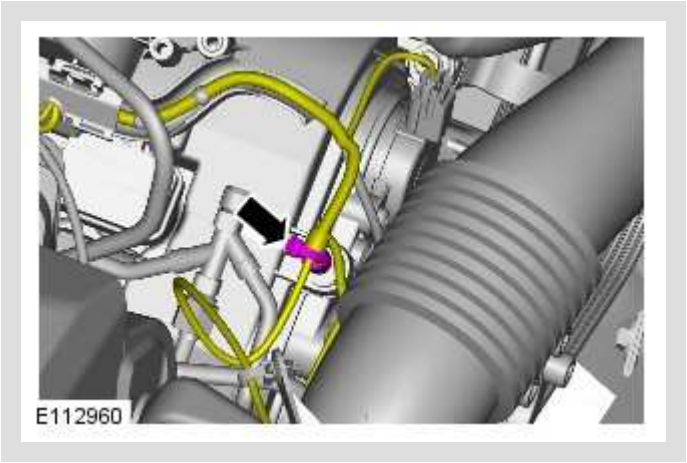
CAUTIONS:

- Be prepared to collect escaping fluids.
- Make sure that all openings are sealed. Use new blanking caps.



13.

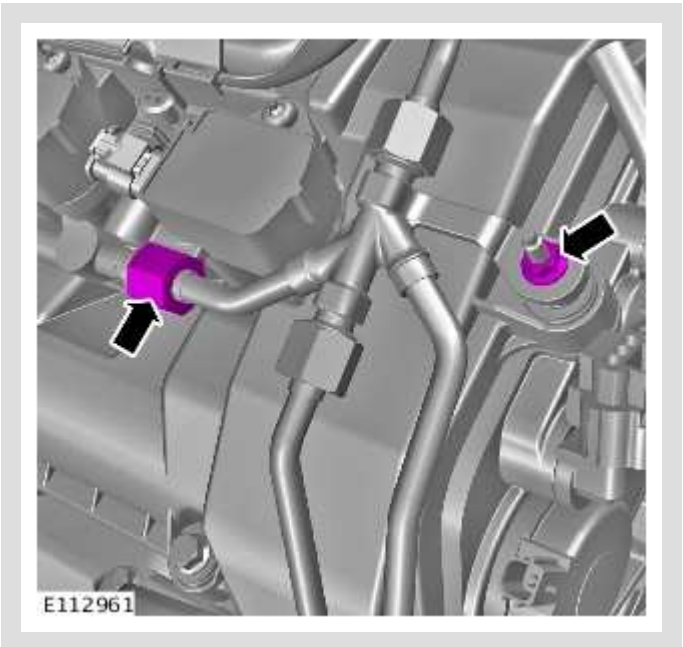
cardiagn.com



14.

CAUTIONS:

- Be prepared to collect escaping fluids.
- Make sure that all openings are sealed. Use new blanking caps.



cardiagn.com

15. **WARNING:**

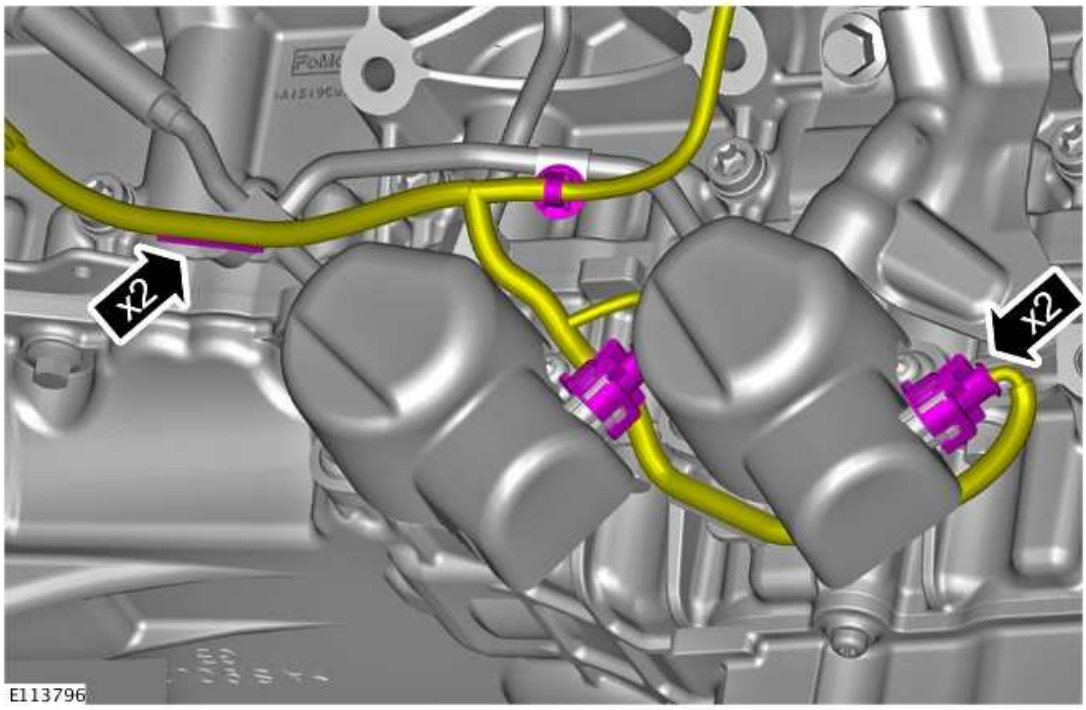
Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

16. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

17. **NOTE:**

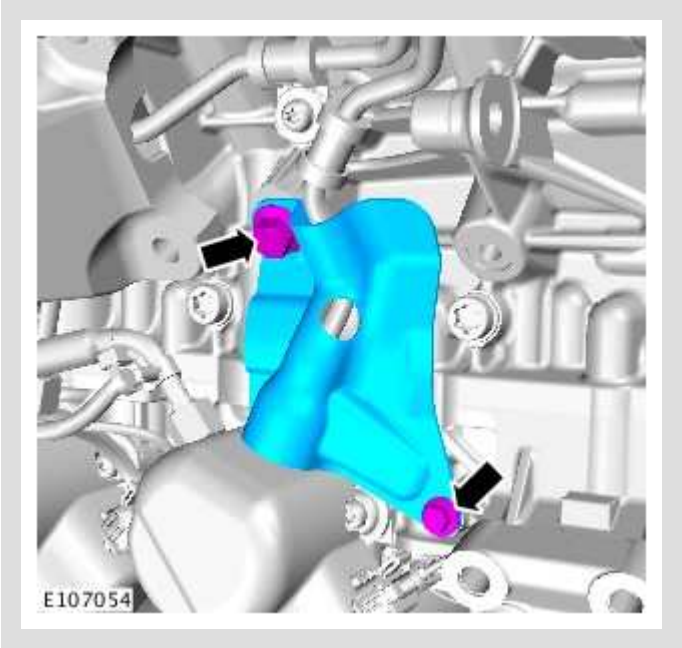
Engine shown removed for clarity.



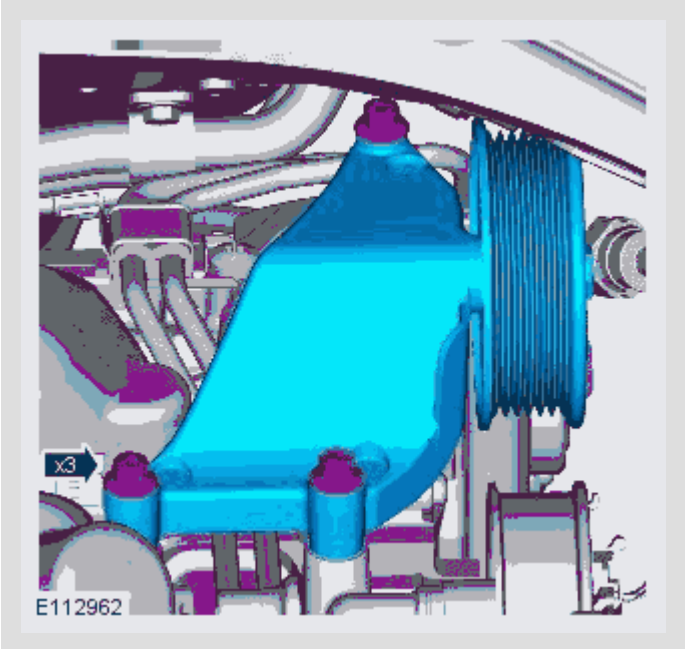
18. **NOTE:**

Engine shown removed for clarity.

cardiagn.com



19.



20.

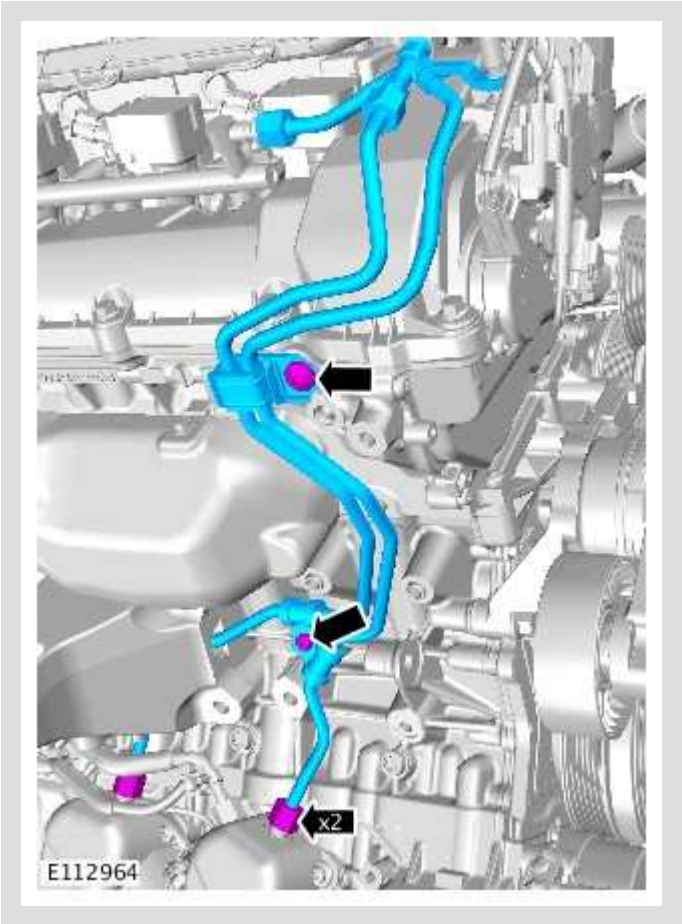
CAUTIONS:

- Be prepared to collect escaping fluids.
- Make sure that all openings are sealed. Use new blanking caps.

cardiagn.com

NOTE:

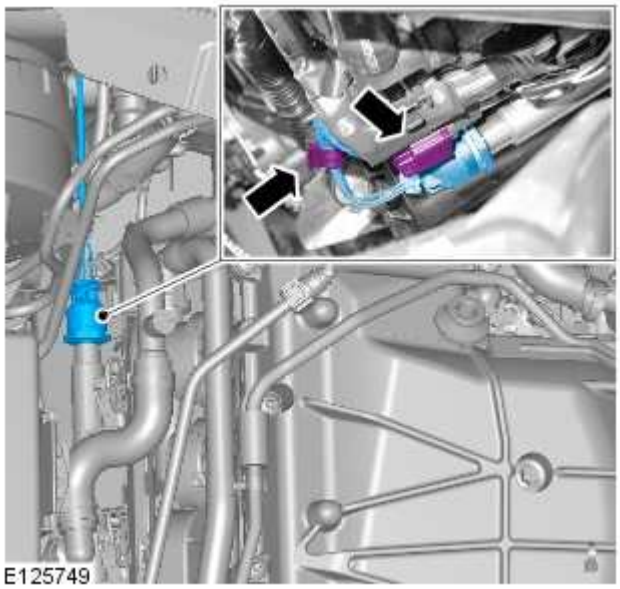
Engine shown removed for clarity.



21. Lower the vehicle.

22.

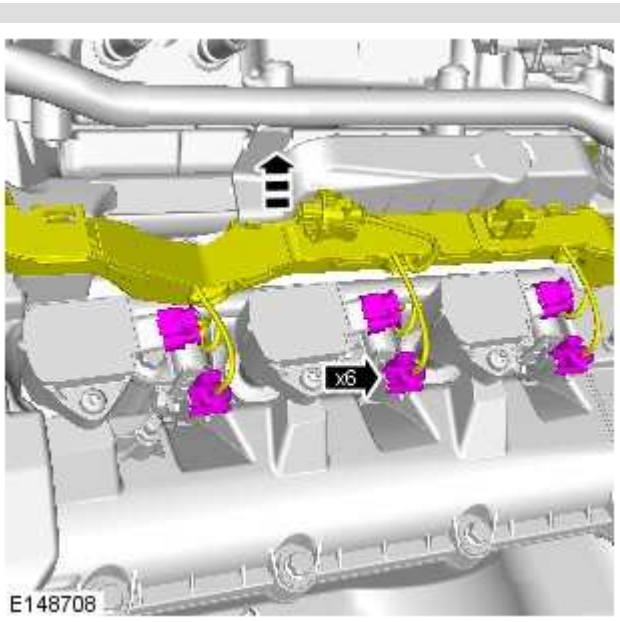
cardiagn.com



23.

NOTE:

LH illustration shown, RH is similar.

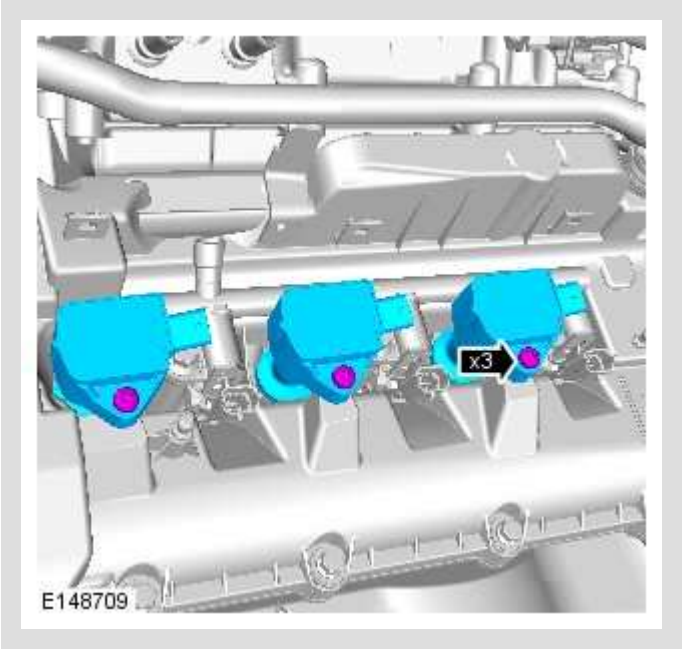


24.

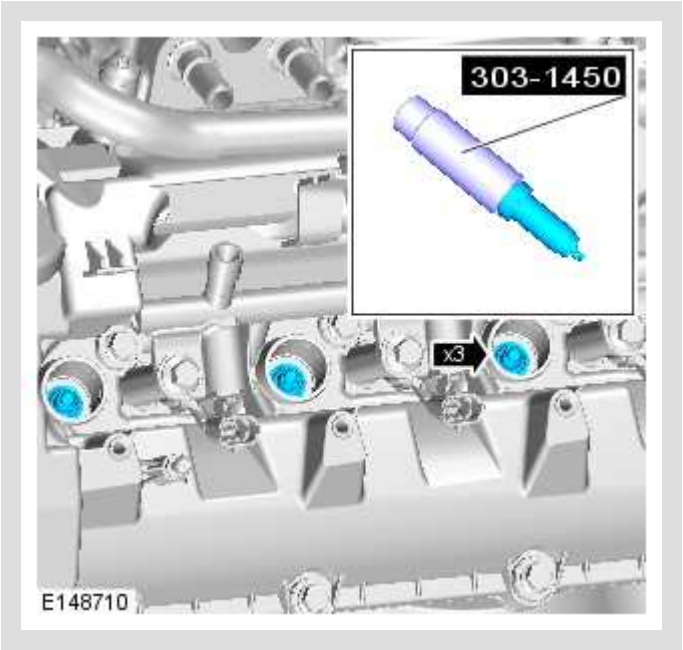
NOTE:

LH illustration shown, RH is similar.

cardiagn.com



25.



Special Tool(s): 303-1450

Torque: **22 Nm**

26.

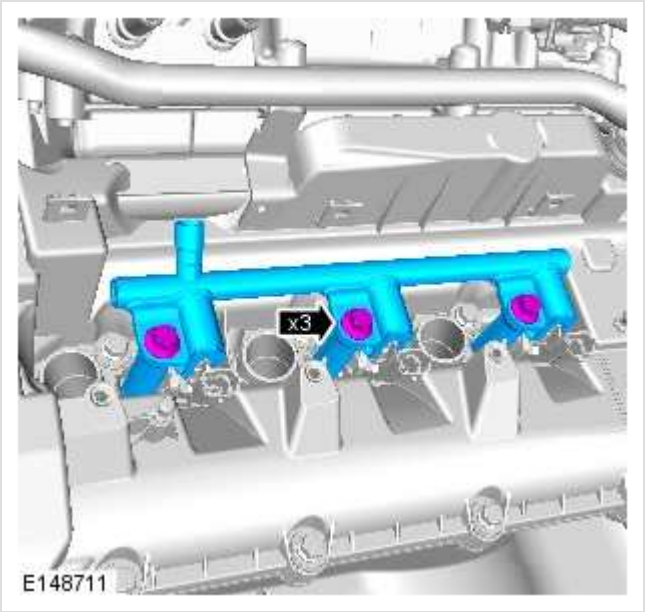
CAUTION:

Make a note of the fuel injector clamp alignment to the fuel rail prior to removal.

NOTE:

cardiagn.com

LH illustration shown, RH is similar.

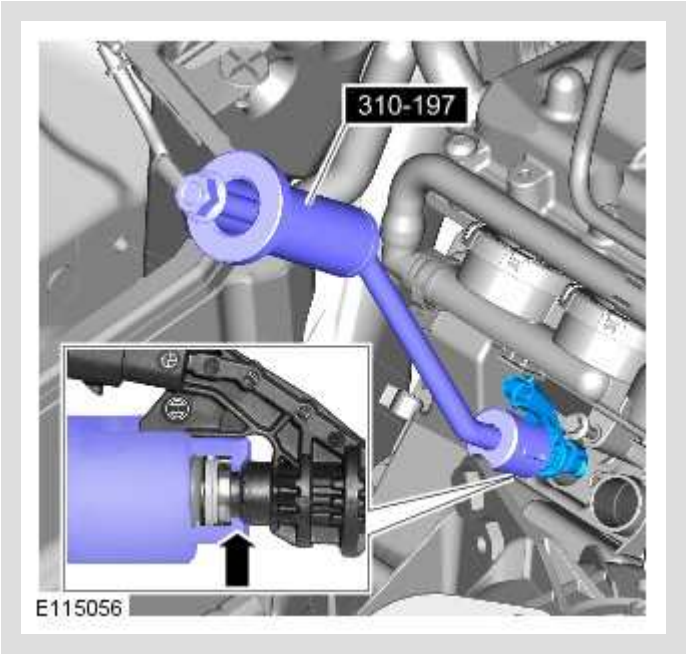


27.

CAUTIONS:

- Make sure that the special tool is located correctly to the fuel injector prior to removing the fuel injector.
- Make sure that the special tool is held square to the fuel injector during removal.
- Make sure that all open ports are covered to prevent any foreign material ingress.

cardiagn.com



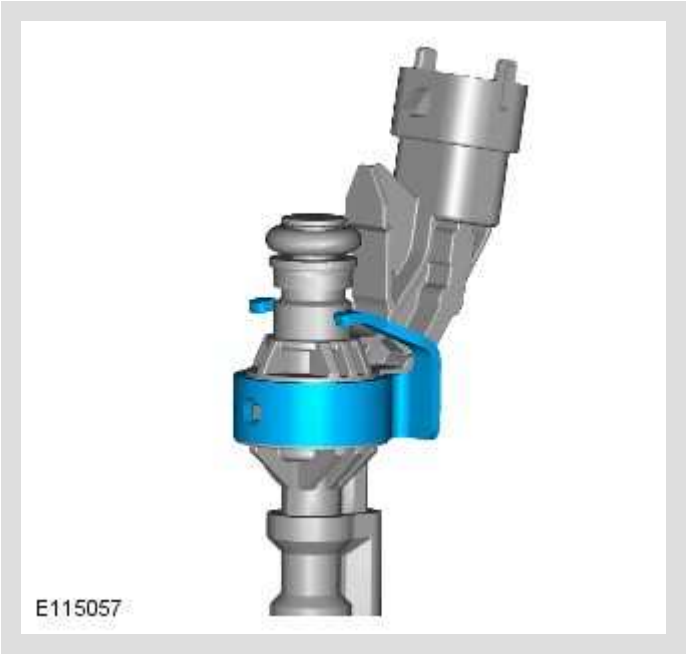
Special Tool(s): 310-197

28.

CAUTIONS:

- If the fuel injector is being removed without a new component being installed, the fuel injector clamp must remain with the fuel injector it is removed with.
- If new fuel injectors are installed, a new injector clamp must be installed.

cardiagn.com



29.

CAUTIONS:

- Do not use a knife to remove the Teflon seal as damage could occur to the fuel injector.
- Do not cut the Teflon seal to deep as damage could occur to the fuel injector.
- Pinch the Teflon seal to allow the tool to cut the Teflon seal without damaging the fuel injector.

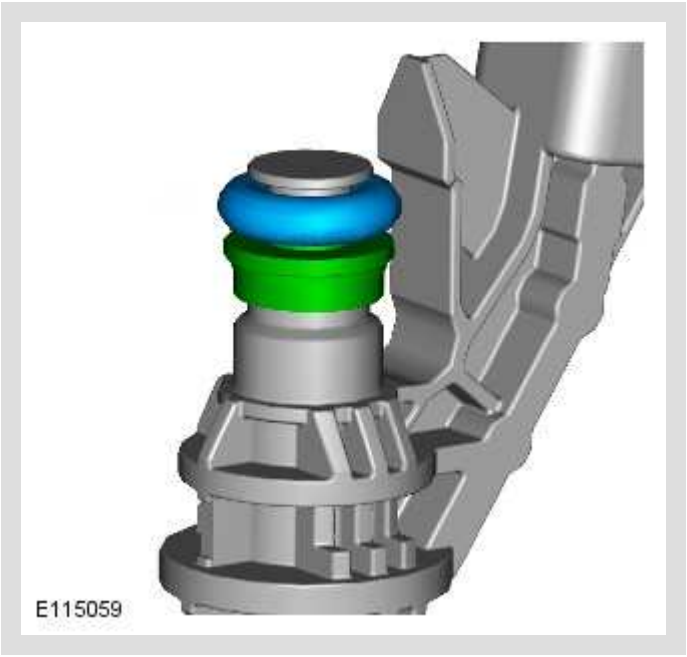
cardiagn.com

30.

CAUTION:

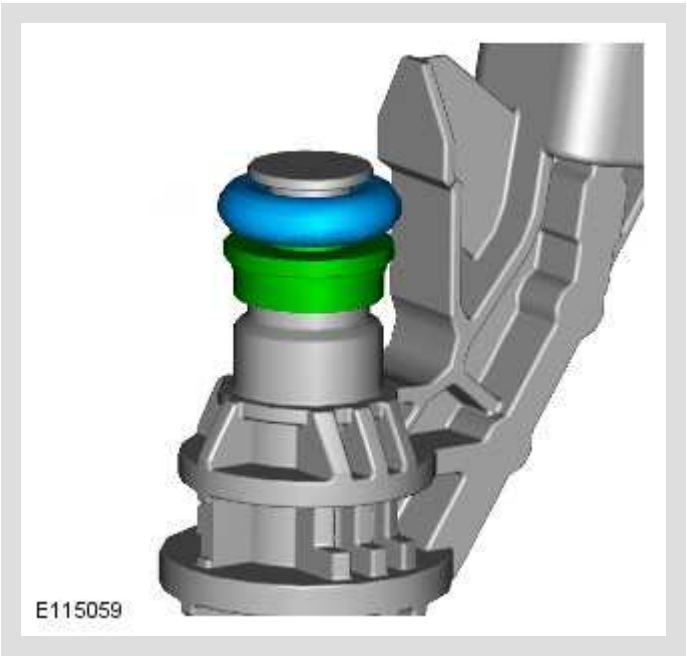
Do not use any sharp tools to remove the O-ring seal as damage could occur to the fuel injector.

cardiagn.com



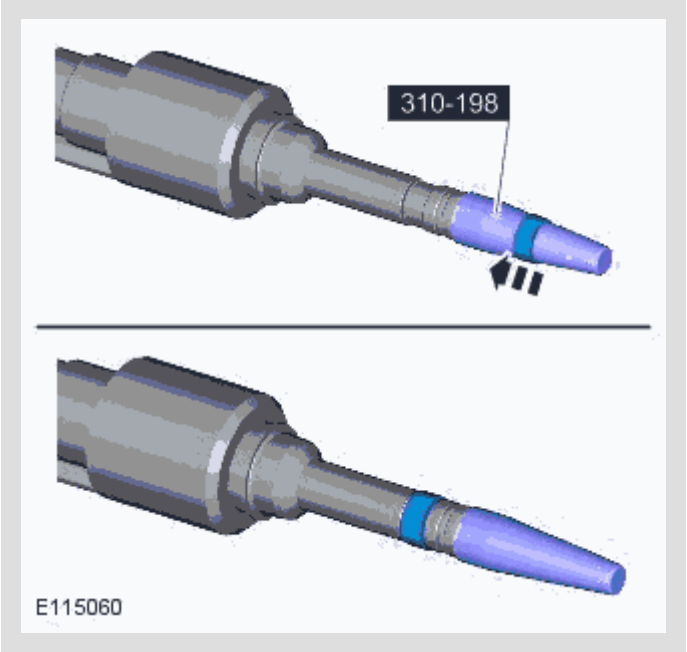
INSTALLATION

1.



cardiagn.com

2.



Special Tool(s): 310-198

3.

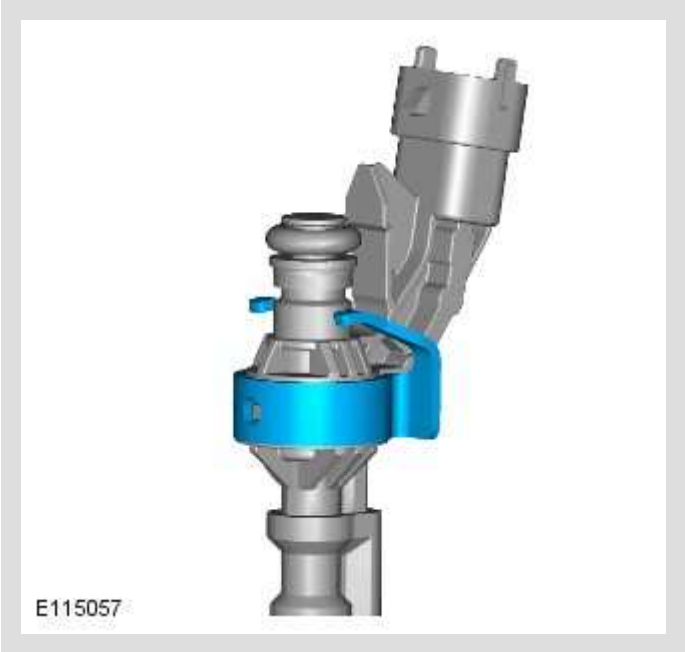
Special Tool(s): 310-199

4.

CAUTION:

If the original fuel injector is being installed, the original fuel injector clamp must installed with the fuel injector it was removed with.

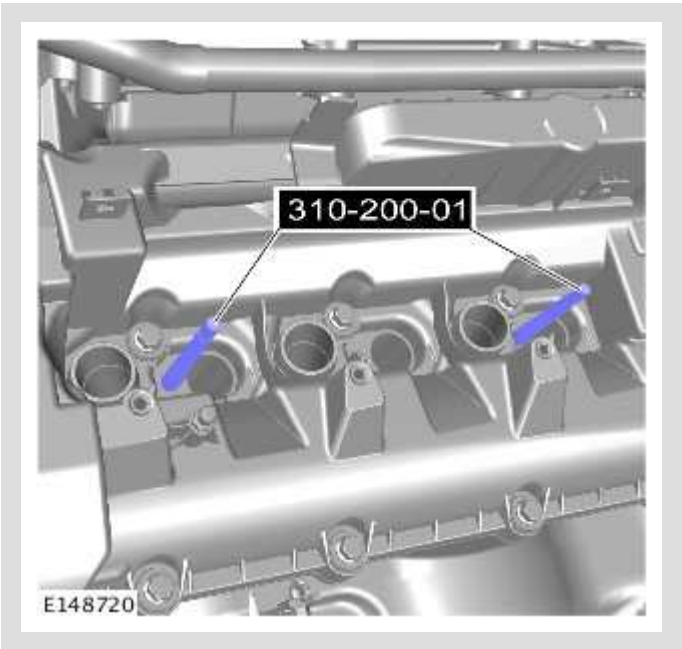
cardiagn.com



5.

CAUTION:

If a new cylinder head has been installed then the special tool 310-200-02 without the thread must be used to install the fuel rail.



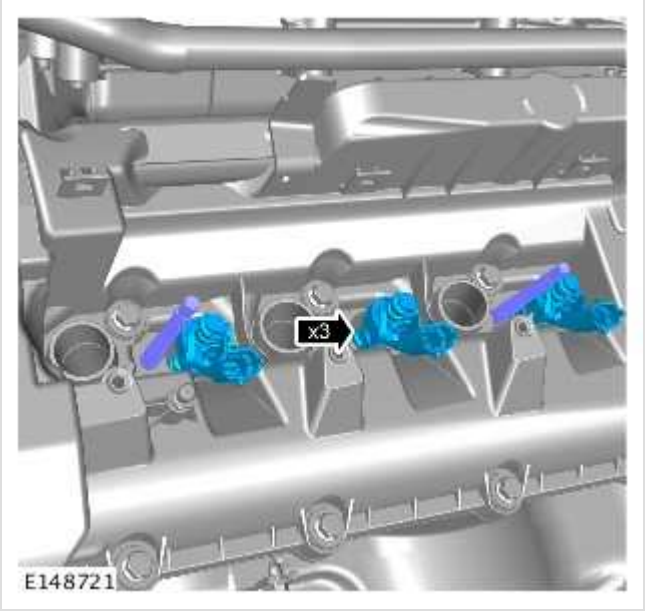
Special Tool(s): 310-200-01

6.

cardiagn.com

CAUTIONS:

- Make sure that the area around the open fuel injector ports are clean and free of foreign material and lubricant prior to installing the fuel injector.
- When installing the fuel injector(s), make sure that the Teflon seal is clean and free of foreign material and lubricant.



7.

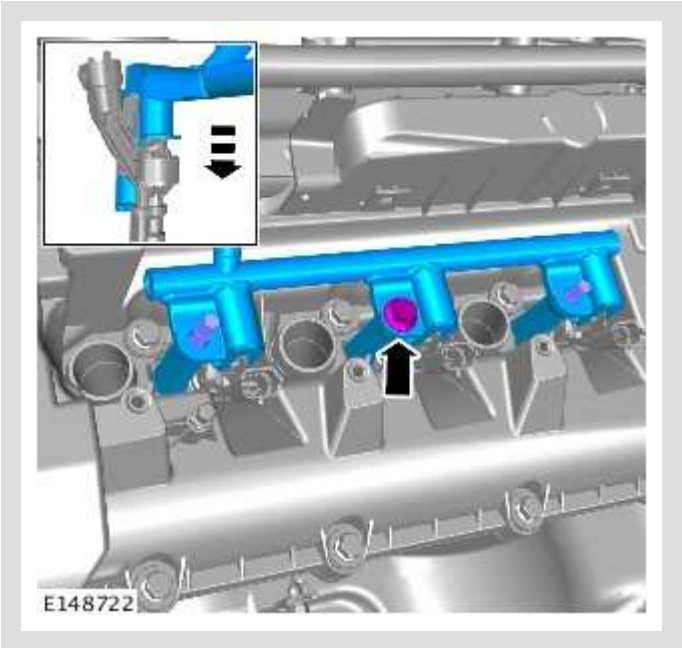
CAUTIONS:

- If new fuel injectors are installed, a new injector clamp must be installed.
- Make sure that the fuel injector is aligned and installed into the fuel rail correctly, as noted in the removal step.
- Tighten the fuel rail retaining bolts a turn at a time until the correct torque is achieved.

NOTE:

cardiagn.com

Lubricate the fuel injector O-ring seals with clean engine oil.



Torque: **20 Nm**

8.

NOTE:

LH illustration shown, RH is similar.

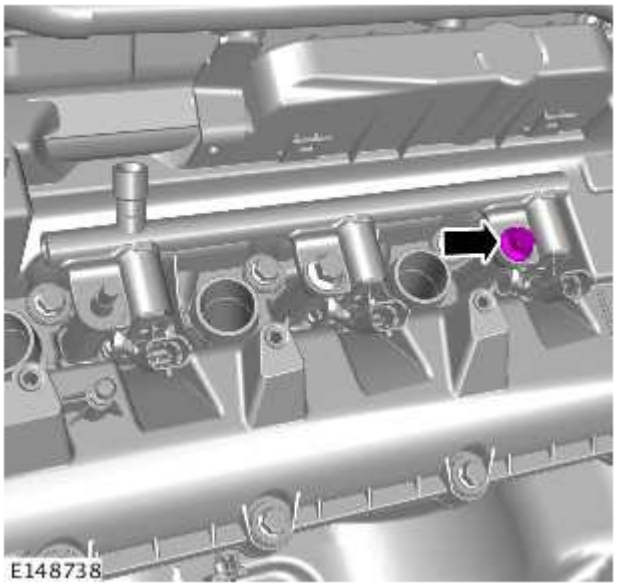
Special Tool(s): 310-200-01

cardiagn.com

9.

NOTE:

LH illustration shown, RH is similar.

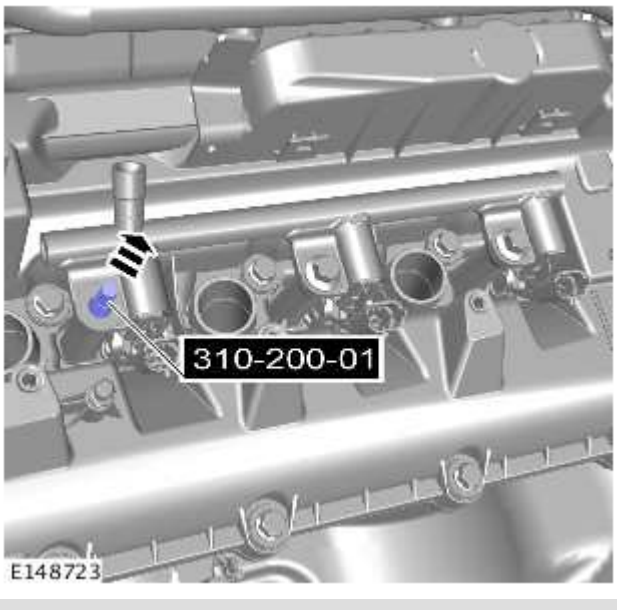


Torque: **20 Nm**

10.

NOTE:

LH illustration shown, RH is similar.



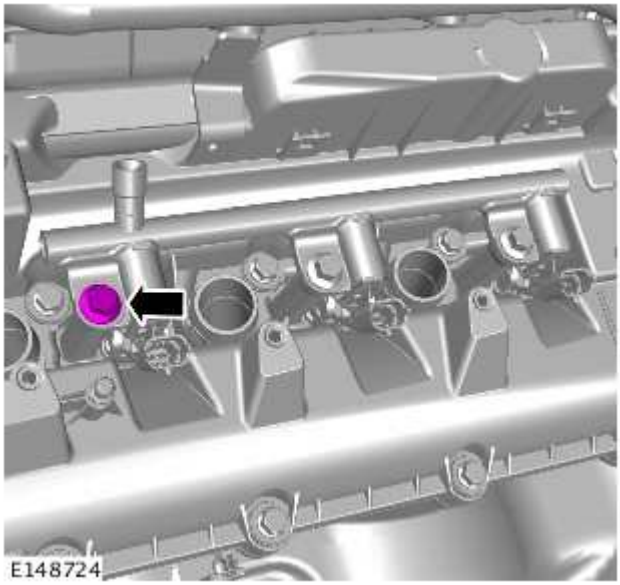
cardiagn.com

Special Tool(s): 310-200-01

11.

NOTE:

LH illustration shown, RH is similar.



Torque: **20 Nm**

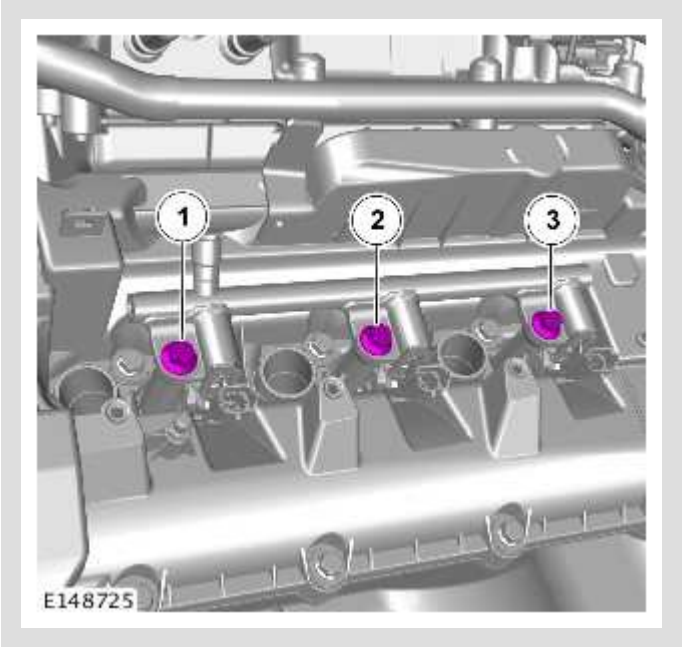
12.

NOTES:

Tighten the bolts in the indicated sequence.

LH illustration shown, RH is similar.

cardiagn.com



Torque:

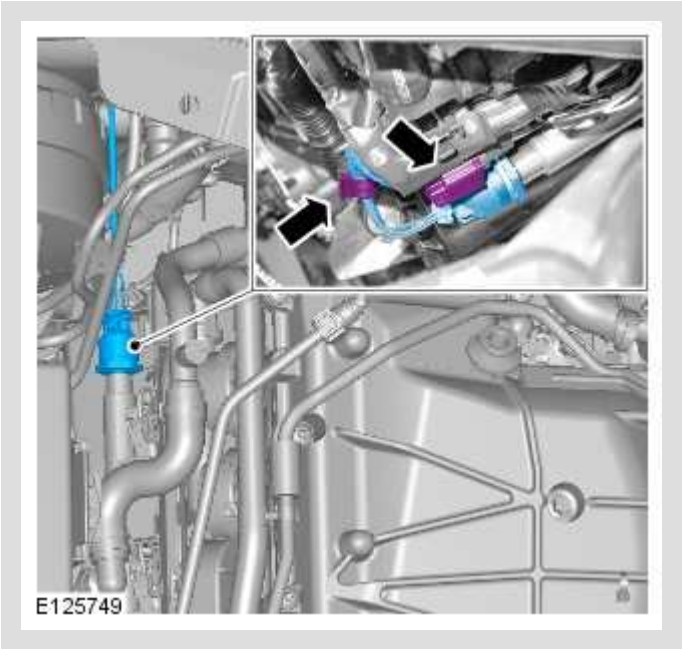
Bolt 2 **30 Nm**

Bolt 3 **30 Nm**

Bolt 1 **30 Nm**

13.

cardiagn.com

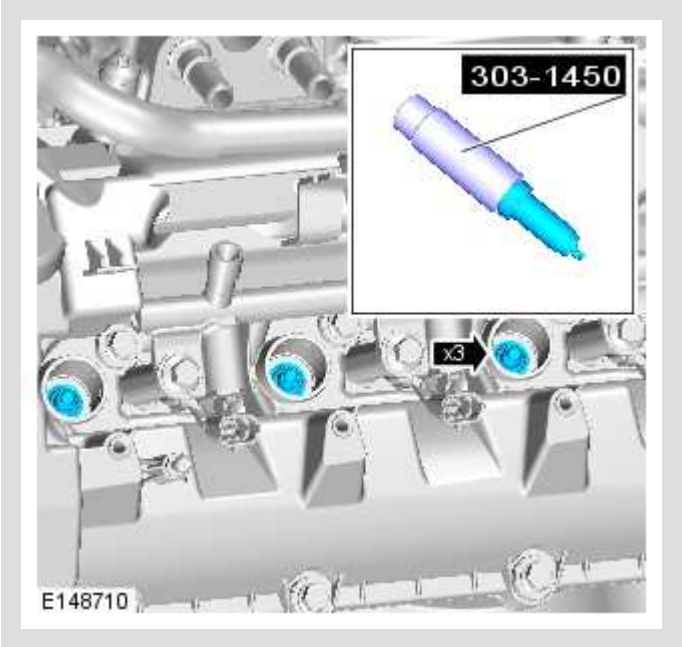


14.

NOTE:

RH illustration shown, LH is similar.

cardiagn.com



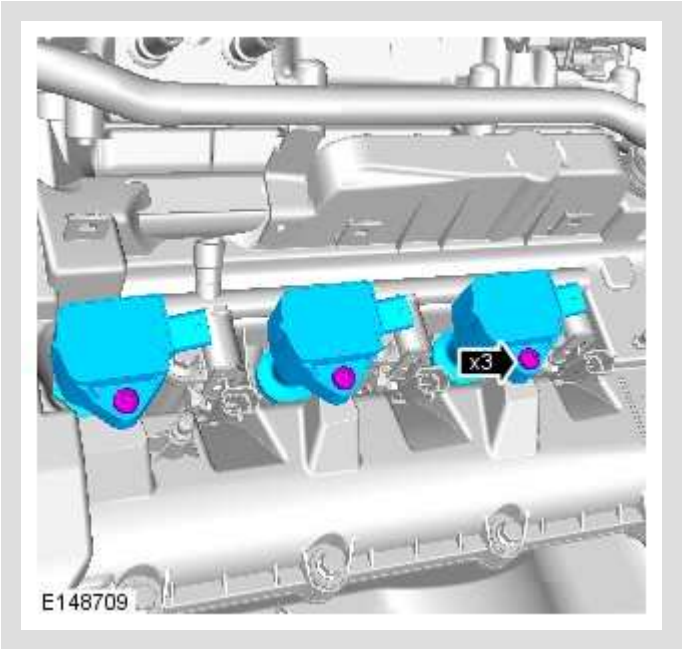
Special Tool(s): 303-1450

15.

NOTE:

LH illustration shown, RH is similar.

cardiagn.com



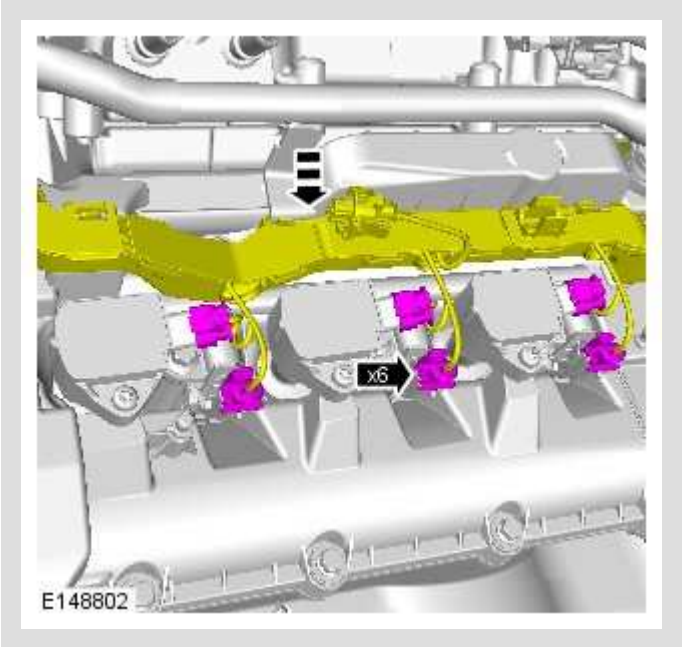
Torque: **7 Nm**

16.

NOTE:

LH illustration shown, RH is similar.

cardiagn.com



17.

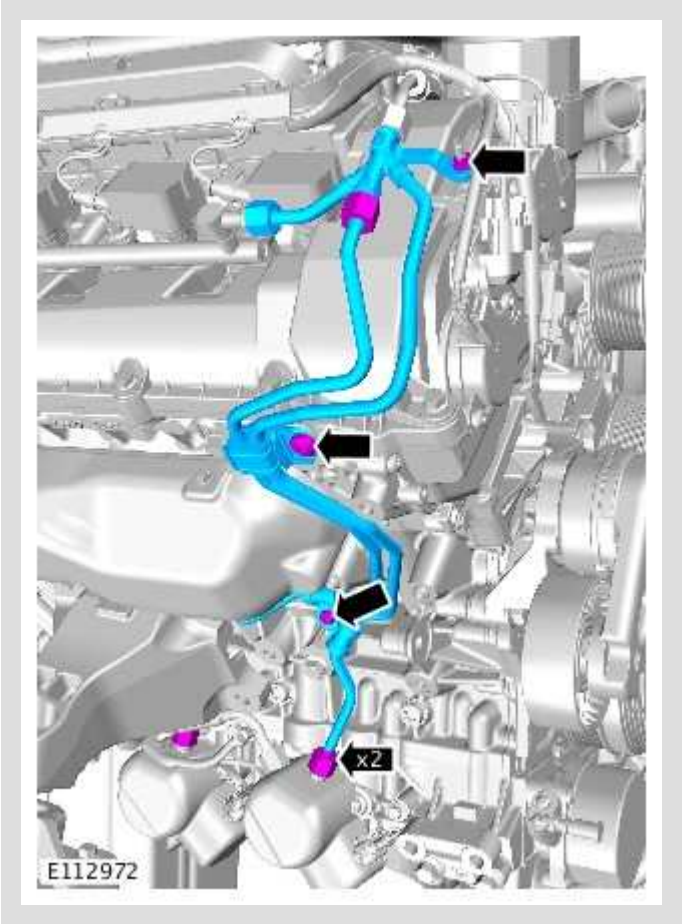
CAUTION:

Lubricate only the union threads with clean engine oil.

NOTES:

- Engine shown removed for clarity.
- Install the bolt and unions finger tight before final tightening.
- Remove and discard the blanking caps.

cardiagn.com



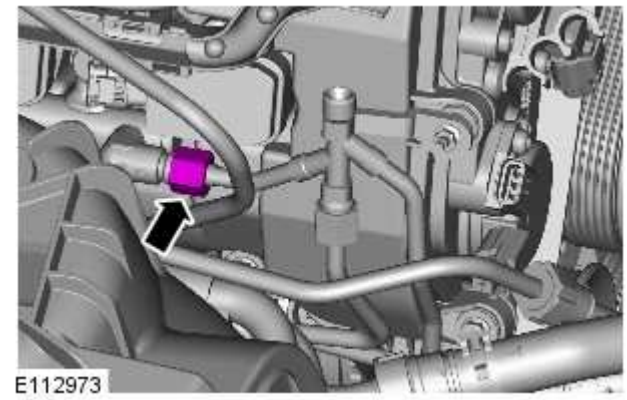
18. Lower the vehicle.

19.

NOTES:

- Do not tighten at this stage.
- Remove and discard the blanking caps.

cardiagn.com



20.

WARNING:

Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

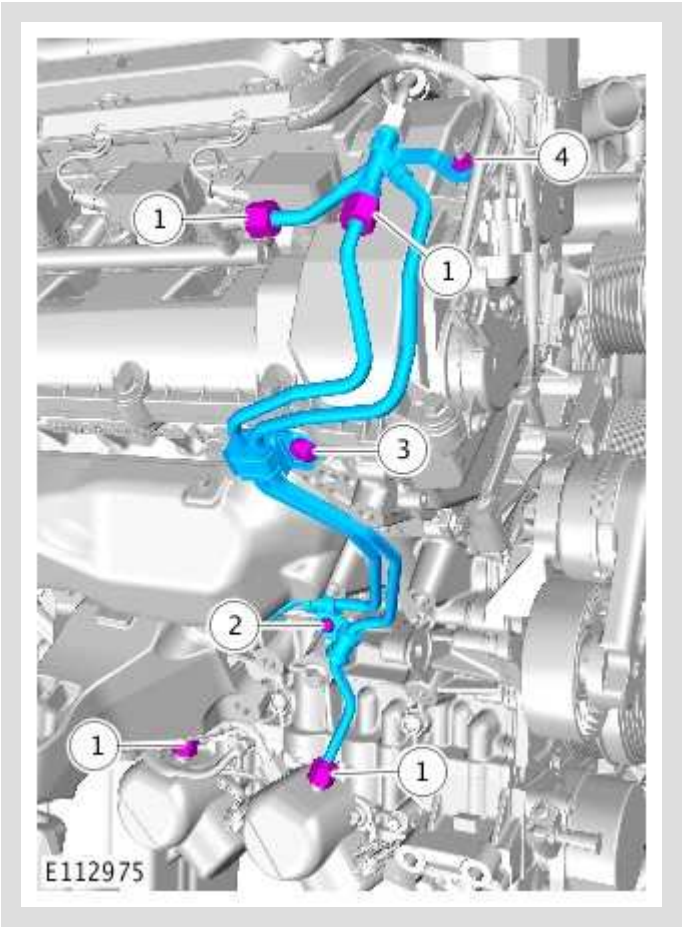
Raise and support the vehicle.

21.

NOTE:

Engine shown removed for clarity.

cardiagn.com



Torque:

Unions (1) **21 Nm**

M6 (2) **11 Nm**

M8 (3) **25 Nm**

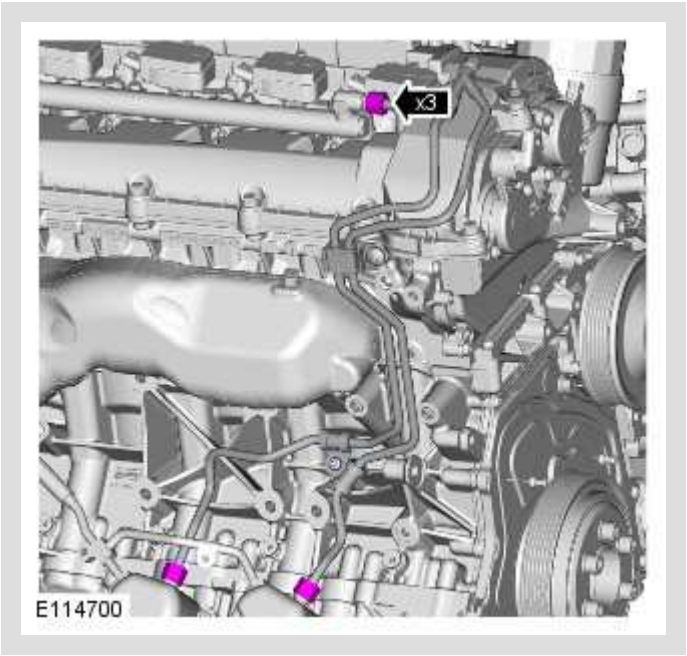
M5 nut (4) **6 Nm**

22.

△ **NOTE:**

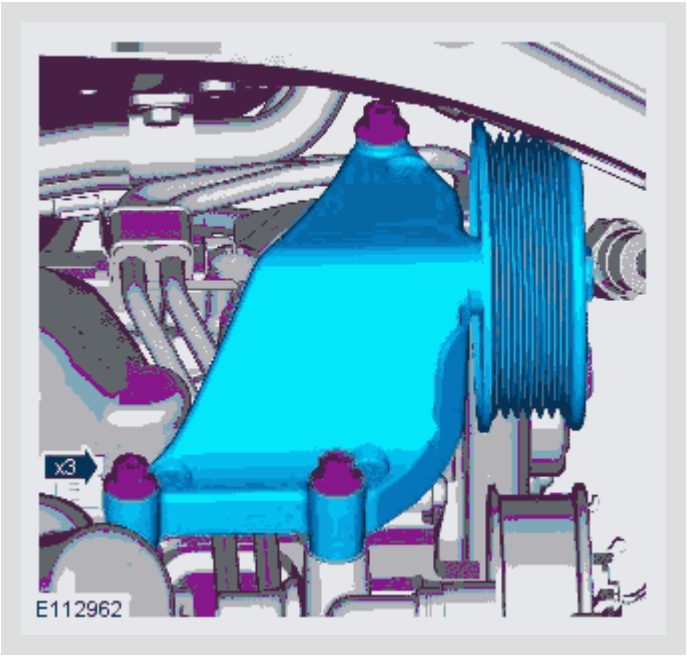
Engine shown removed for clarity.

cardiagn.com



Torque: **21 Nm**

23.

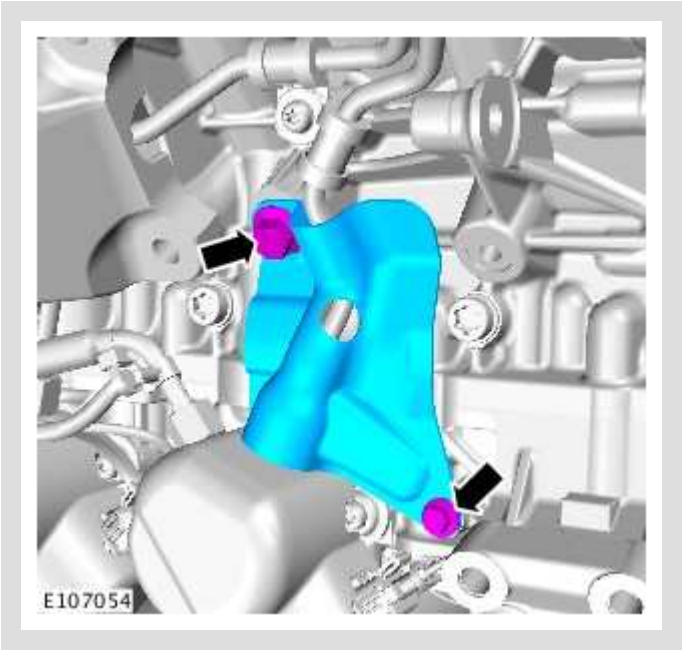


24.

NOTE:

Engine shown removed for clarity.

cardiagn.com



Torque:

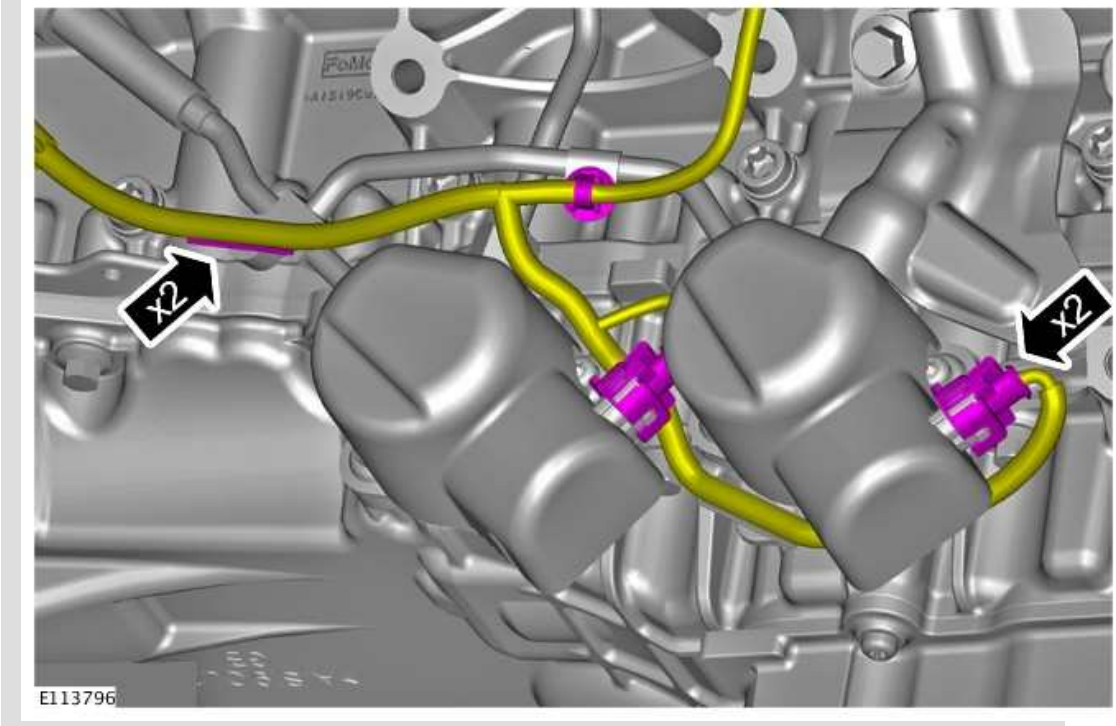
M10 **29 Nm**

M6 **11 Nm**

25.

NOTE:

Engine shown removed for clarity.

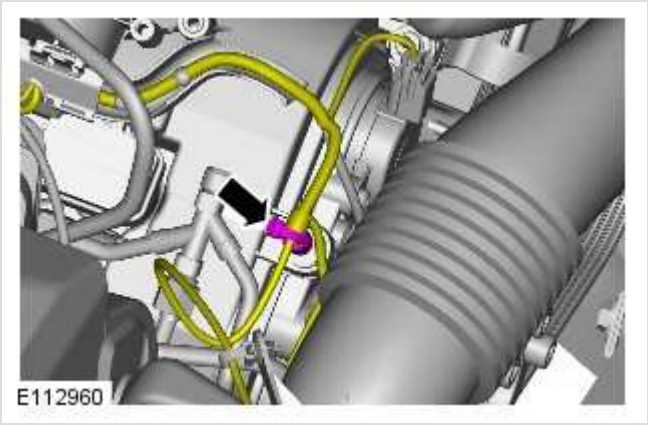


cardiagn.com

26. Refer to: Air Deflector (501-02 Front End Body Panels, Removal and Installation).

27. Lower the vehicle.

28.



29.

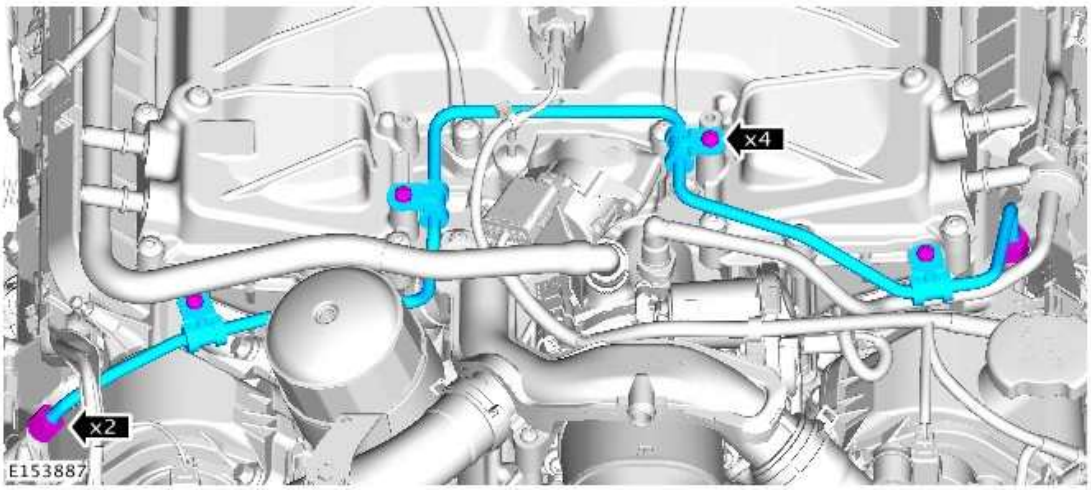
CAUTION:

Lubricate only the union threads with clean engine oil.

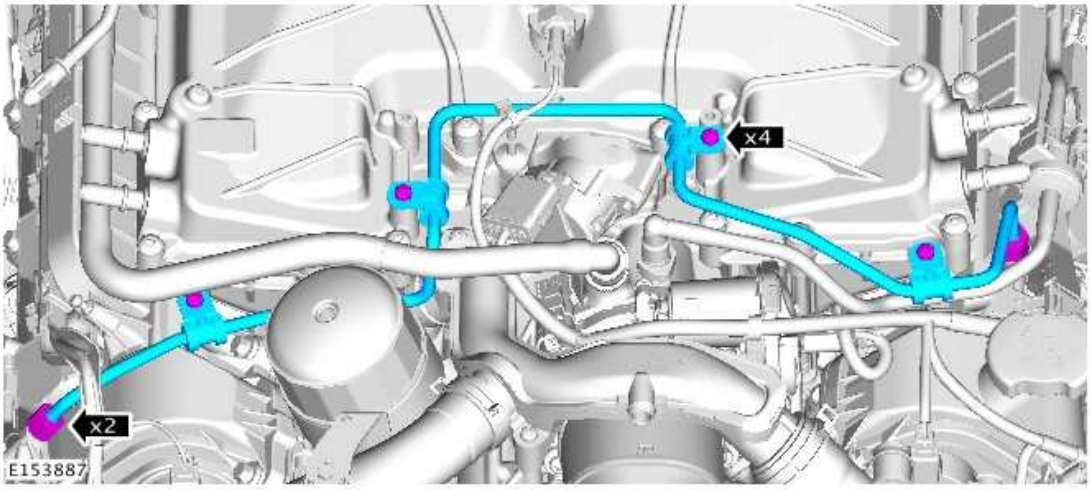
NOTES:

- Do not tighten at this stage.
- Remove and discard the blanking caps.

cardiagn.com



30.



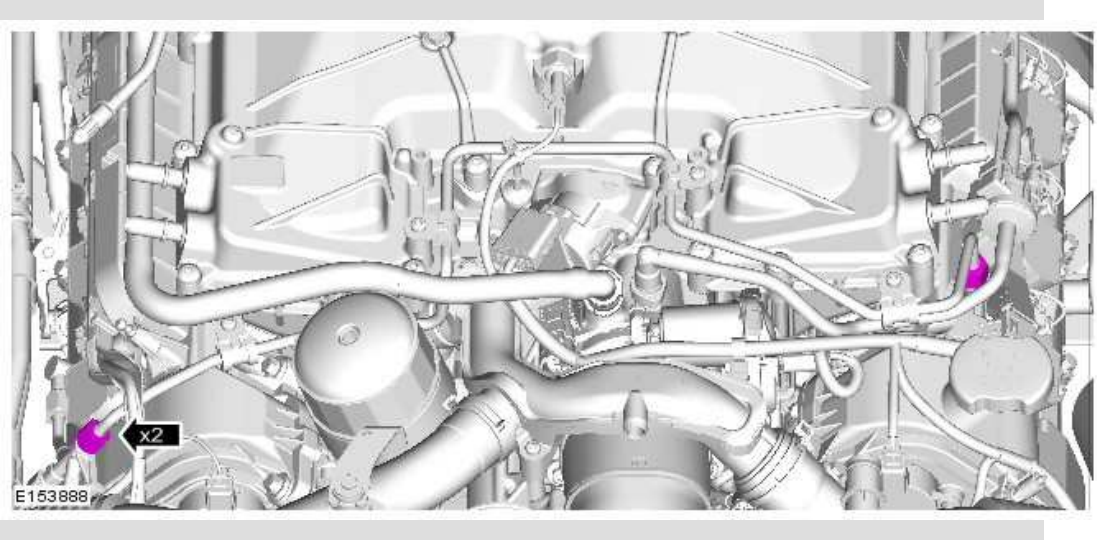
Torque:

Unions **21 Nm**

Bolts **8 Nm**

31.

cardiagn.com



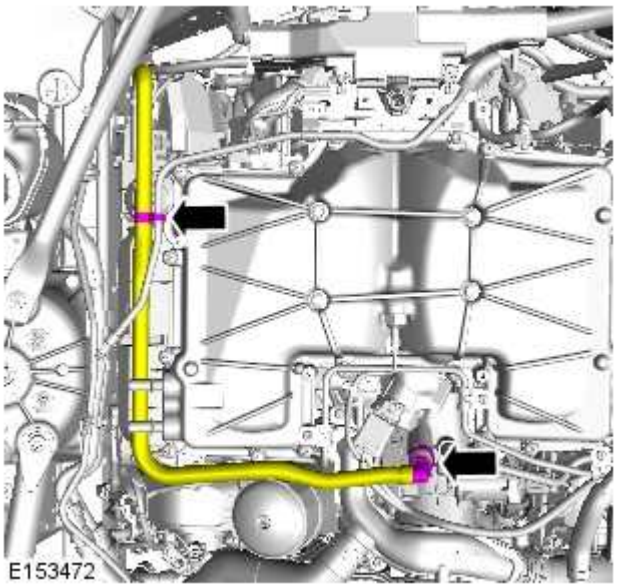
Torque: **21 Nm**

32. Refer to: Air Cleaner Outlet Intermediate Pipe RH (303-12B Intake Air Distribution and Filtering - V8 S/C 5.0L Petrol, Removal and Installation).

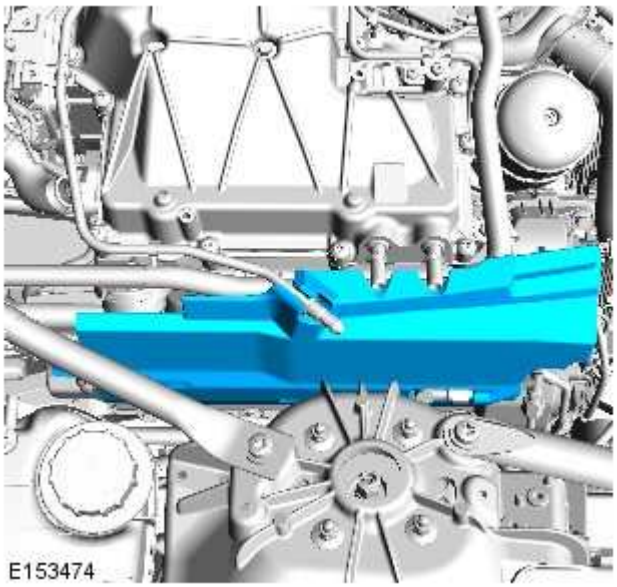
33. **CAUTION:**

Be prepared to collect escaping fluids.

cardiagn.com

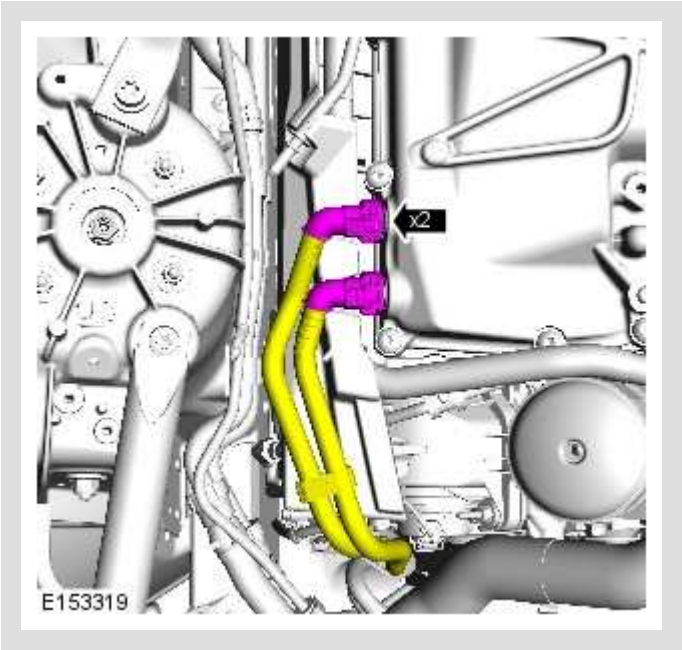


34.

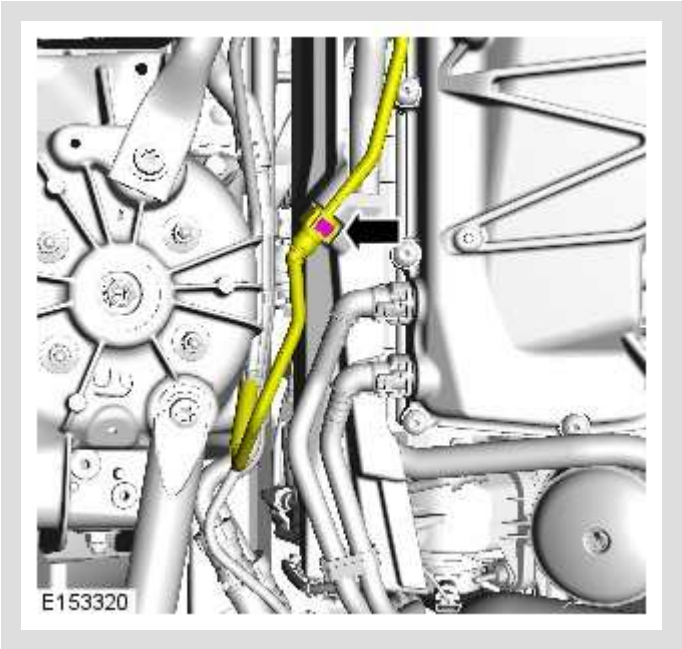


35.

cardiagn.com

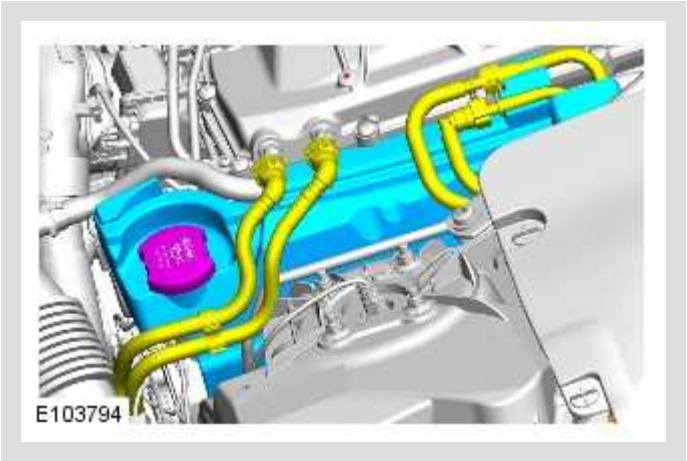


36.

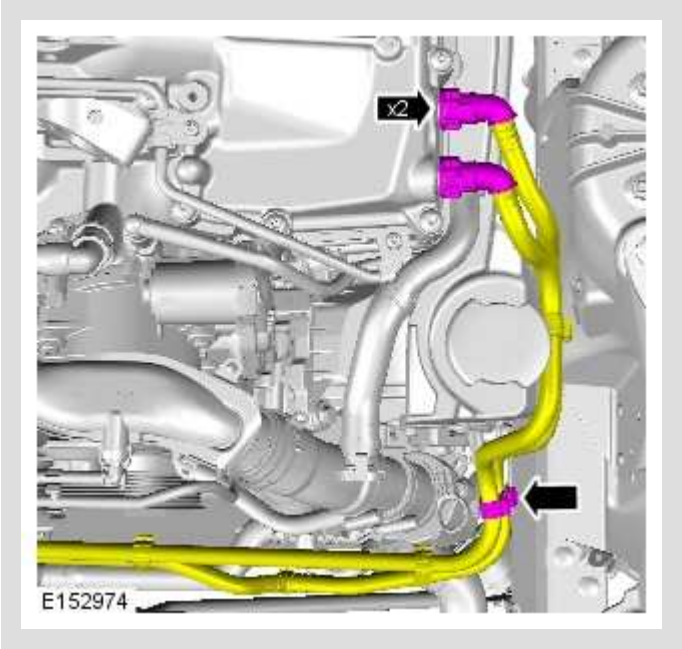


37.

cardiagn.com



38.



39. Refer to: Secondary Bulkhead Panel RH (501-02 Front End Body Panels, Removal and Installation).

40. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

2015.0 F-TYPE (X152), 303-12

INTAKE AIR DISTRIBUTION AND FILTERING - V6 S/C 3.0L PETROL

SUPERCHARGER (G1580354)

REMOVAL AND INSTALLATION

18.50.15	SUPERCHARGER ASSEMBLY - RENEW	3000 CC, AJ V6 (AJ126)	3.3	USED WITHINS	

SPECIAL TOOL(S)

303-1449-01

Supercharger Installation Guide Pins - Threaded

cardiagn.com

E115267	**303-1449-02** Supercharger Installation Guide Pins - Unthreaded

REMOVAL

CAUTION:

If a new cylinder head has been installed, then new taptite bolts must be used to install the supercharger.

NOTES:

- New taptite bolts when used cut their own threads on the first application.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

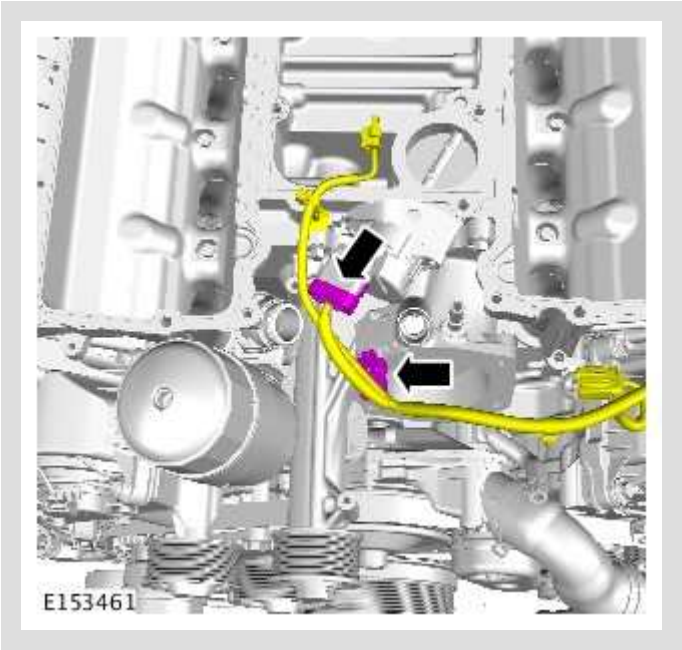
cardiagn.com

Raise and support the vehicle.

3. Refer to: Charge Air Cooler (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

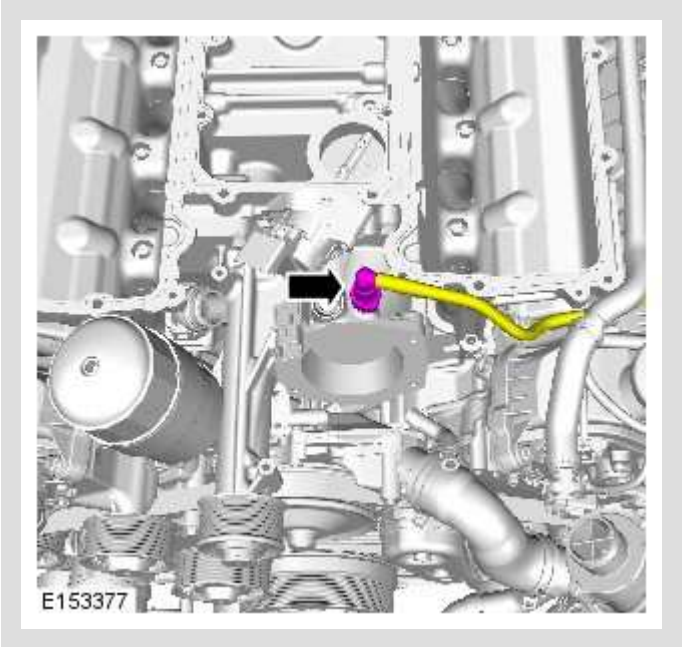
4. Refer to: Throttle Body (303-04B Fuel Charging and Controls - V8 S/C 5.0L Petrol, Removal and Installation).

5. Refer to: Supercharger Belt (303-05B Accessory Drive - V8 S /C 5.0L Petrol, Removal and Installation).

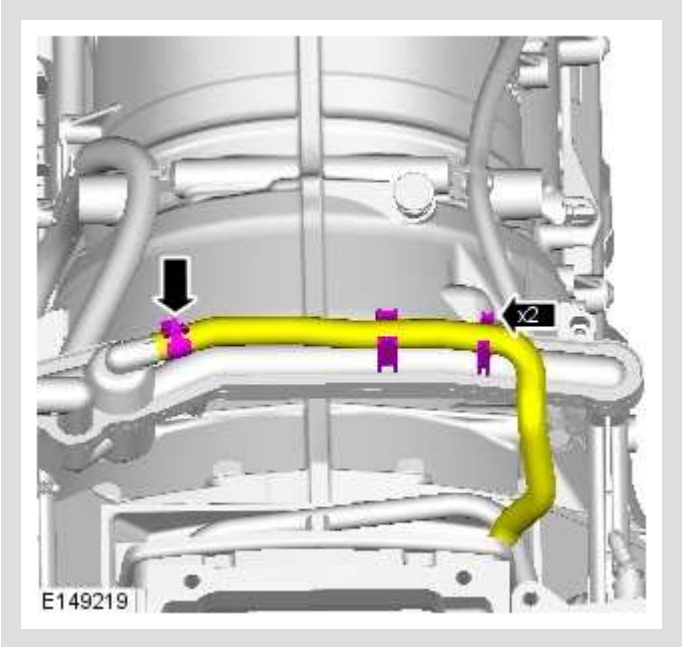
6. 

7.

cardiagn.com

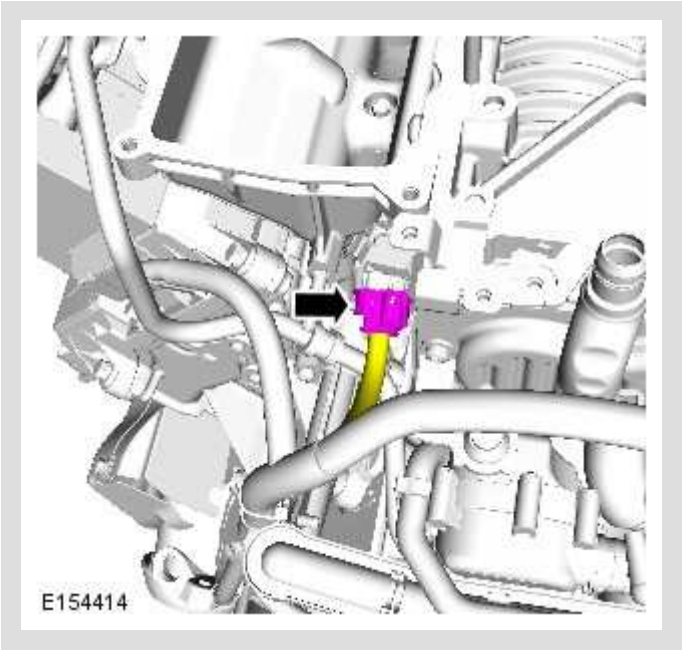


8.



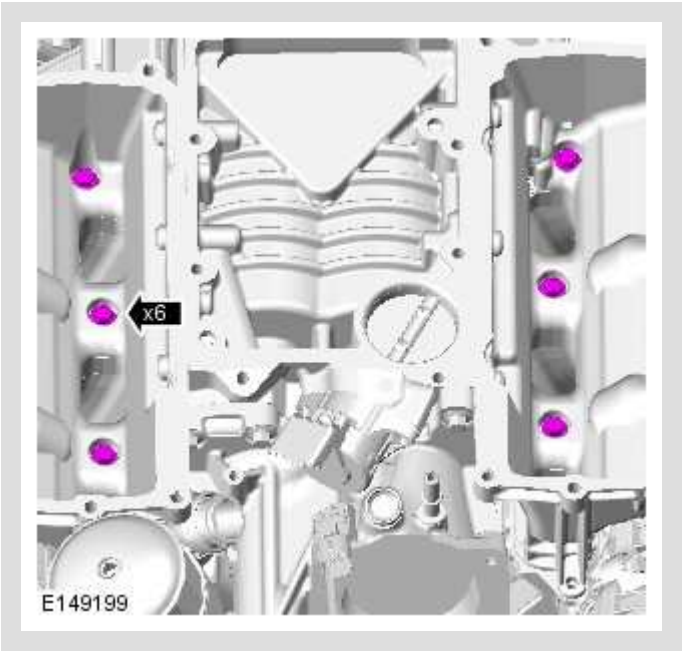
9.

cardiagn.com

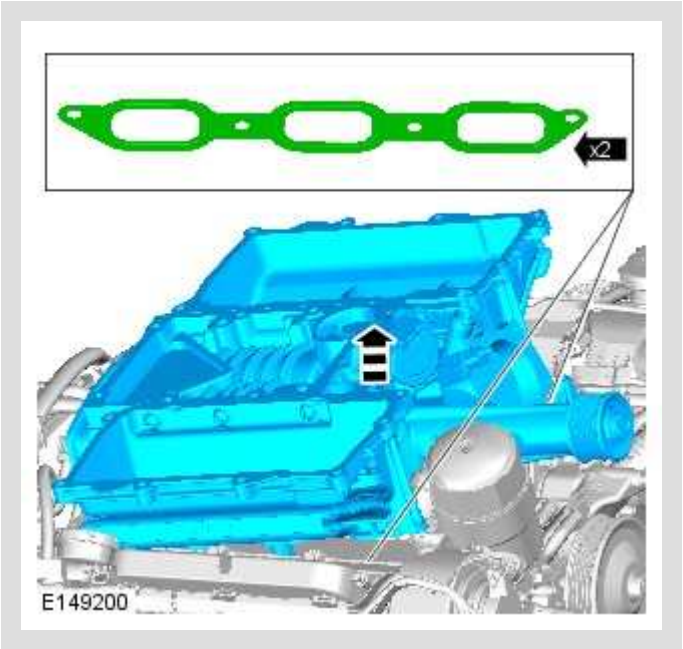


10.

cardiagn.com



11.



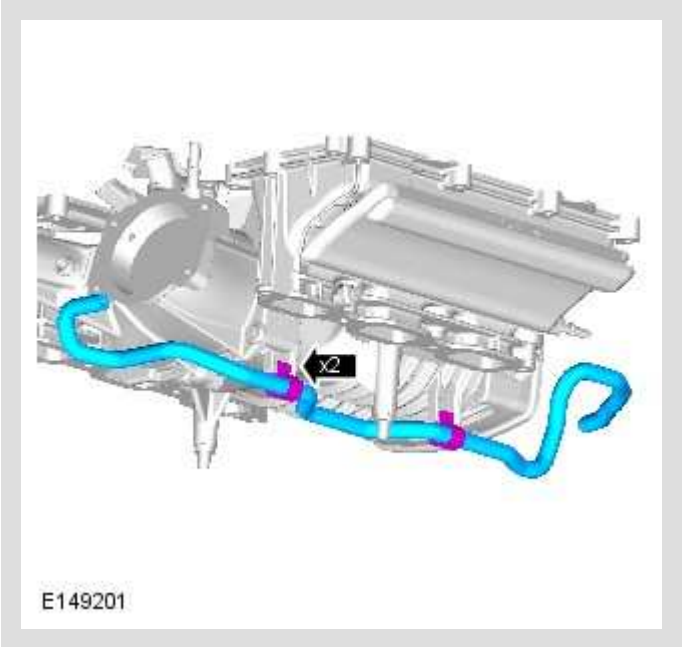
Discard the gaskets.

12.

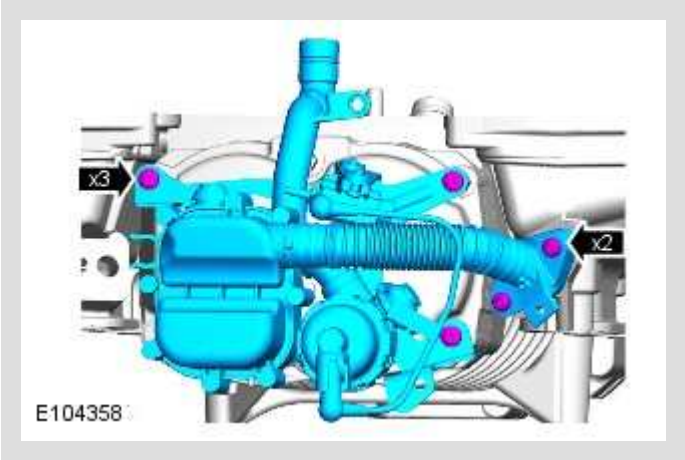
NOTE:

Do not disassemble further if the component is removed for access only.

cardiagn.com

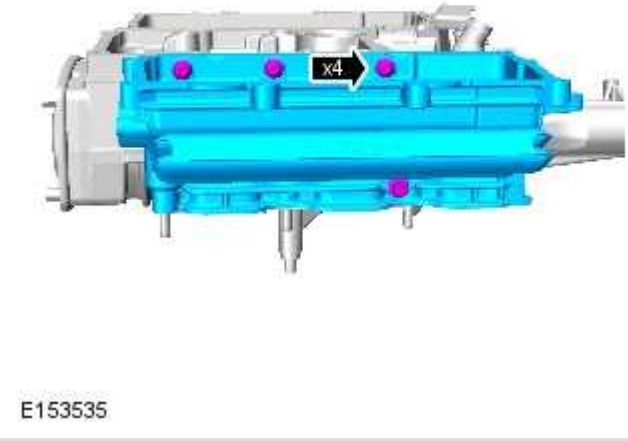


13.



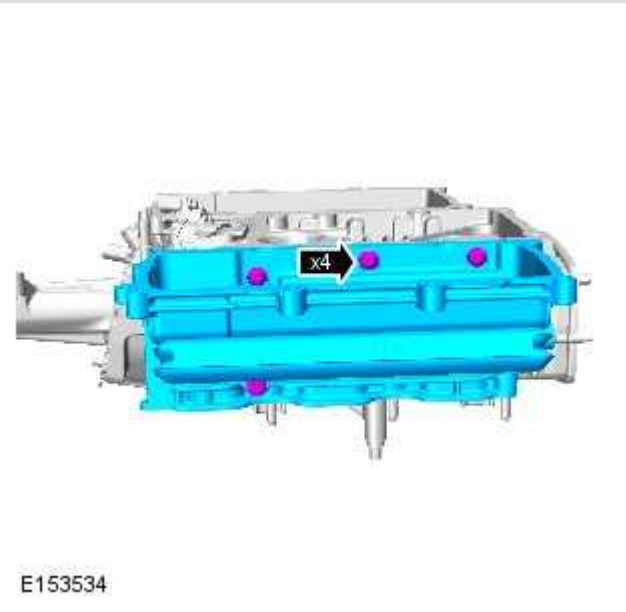
14.

cardiagn.com



E153535

15.



E153534

INSTALLATION

CAUTION:

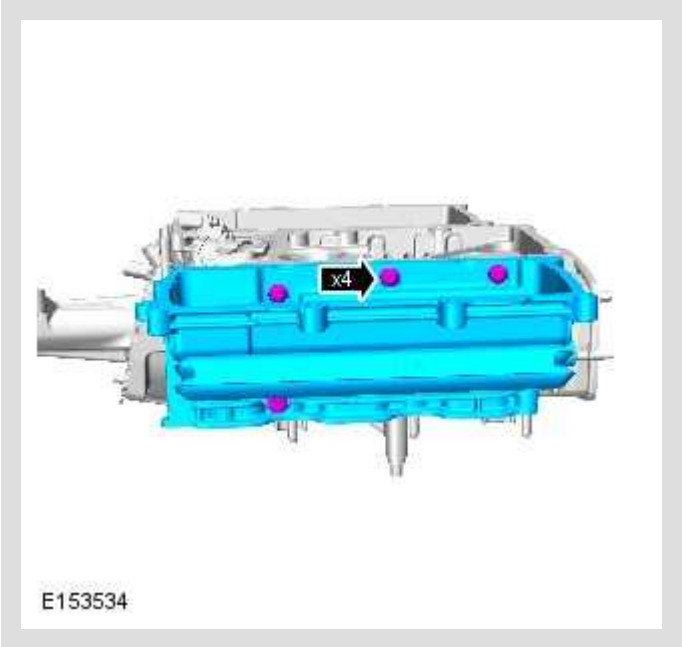
If a new cylinder head has been installed, then new taptite bolts must be used to install the supercharger.

NOTE:

cardiagn.com

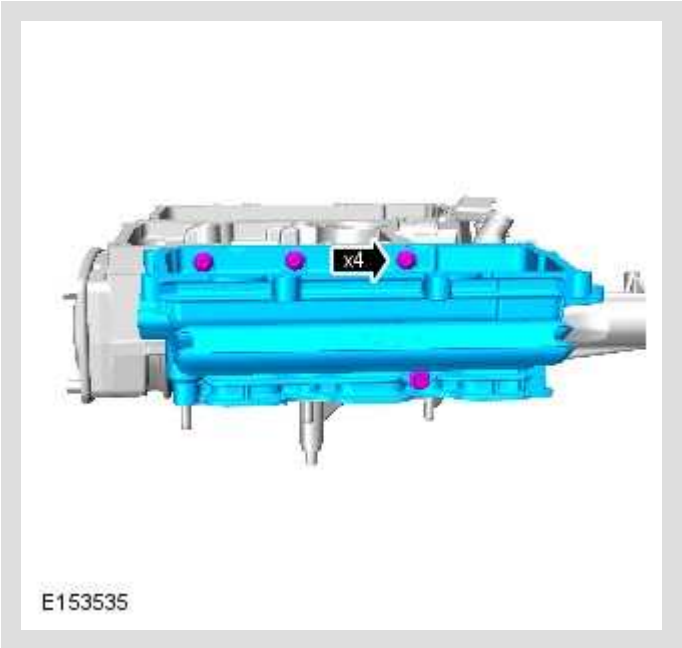
New taptite bolts when used cut their own threads on the first application.

1.



Torque: **25 Nm**

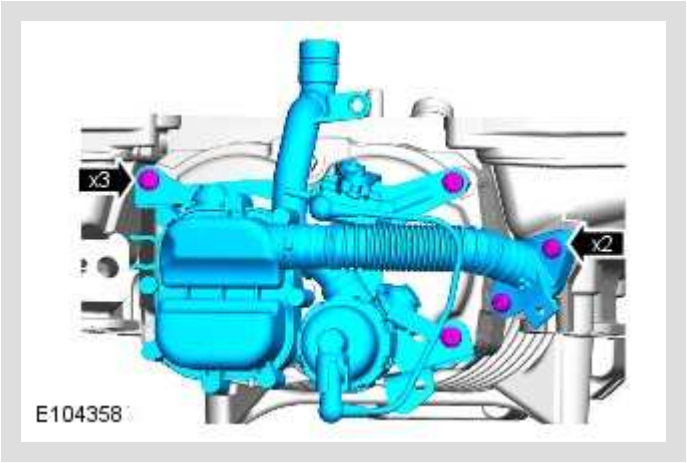
2.



Torque: **25 Nm**

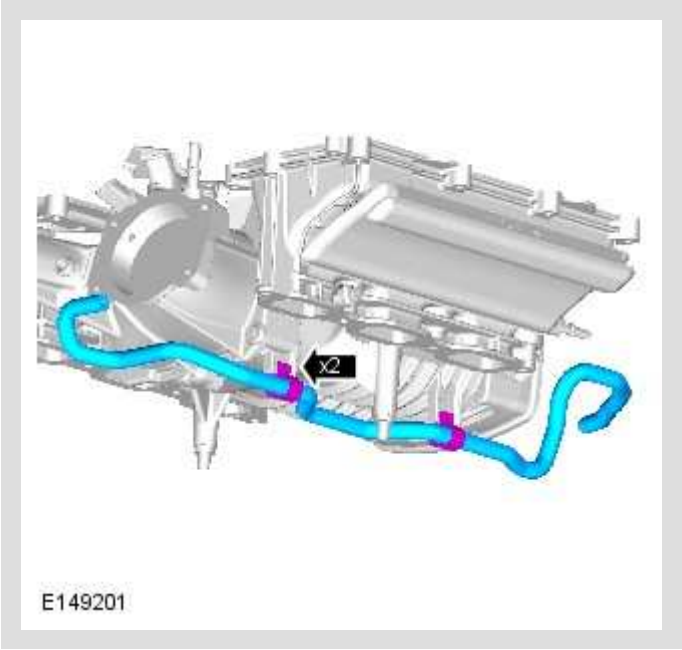
3.

cardiagn.com



Torque: **10 Nm**

4.



5.

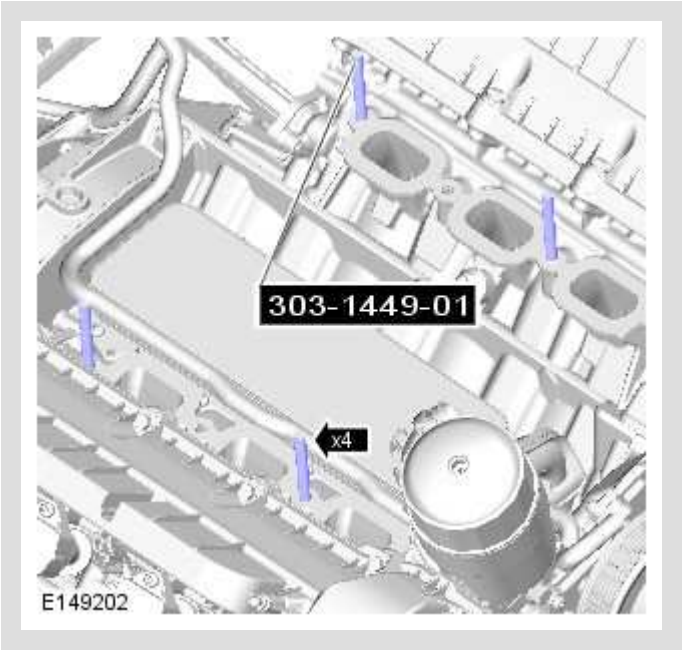
CAUTIONS:

- If a new cylinder head has been installed then the special tool 303-1449-02 without the thread must be used to install the supercharger.
- If a new cylinder head has been installed, then new taptite bolts must be used to install the supercharger.

cardiagn.com

NOTE:

New taptite bolts when used cut their own threads on the first application.



Special Tool(s): 303-1449-01 , 303-1449-02

6.

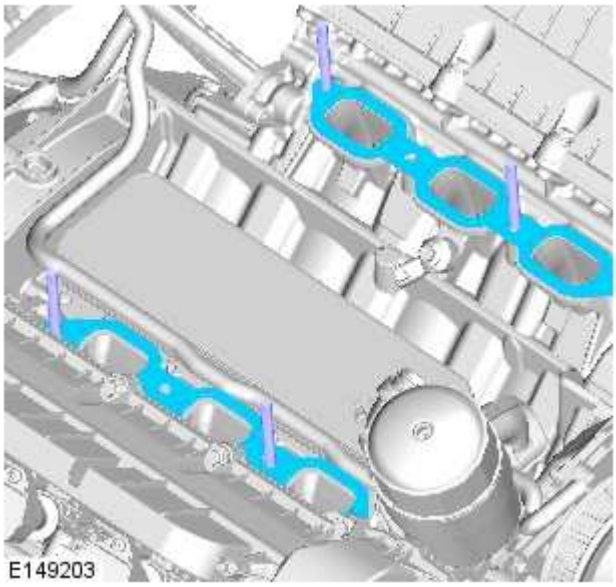
CAUTION:

Make sure that the mating faces are clean and free of foreign material.

NOTE:

Install new gaskets.

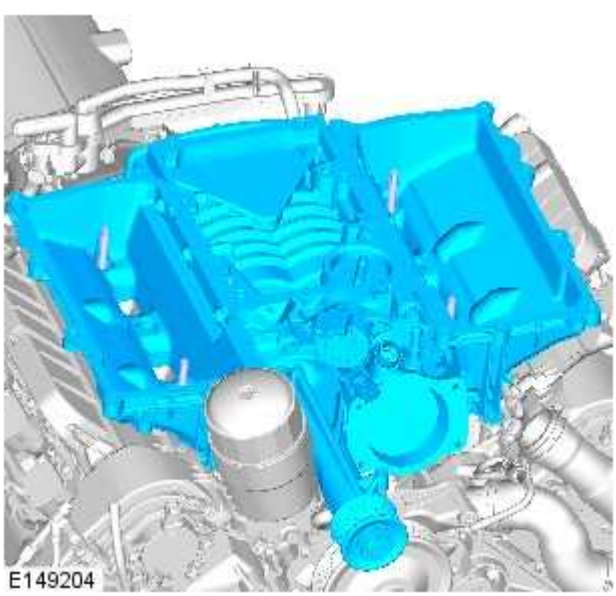
cardiagn.com



7.

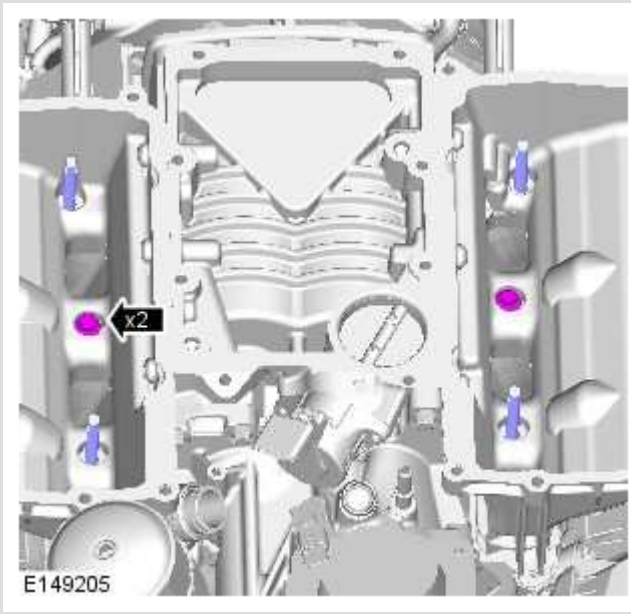
CAUTION:

Make sure that the mating faces are clean and free of foreign material.



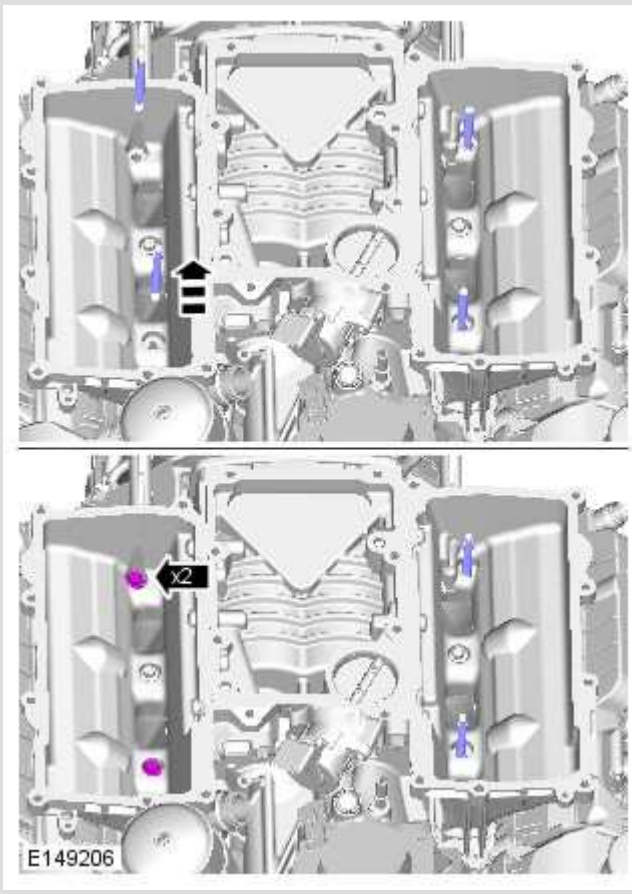
cardiagn.com

8.



Torque: **25 Nm**

9.

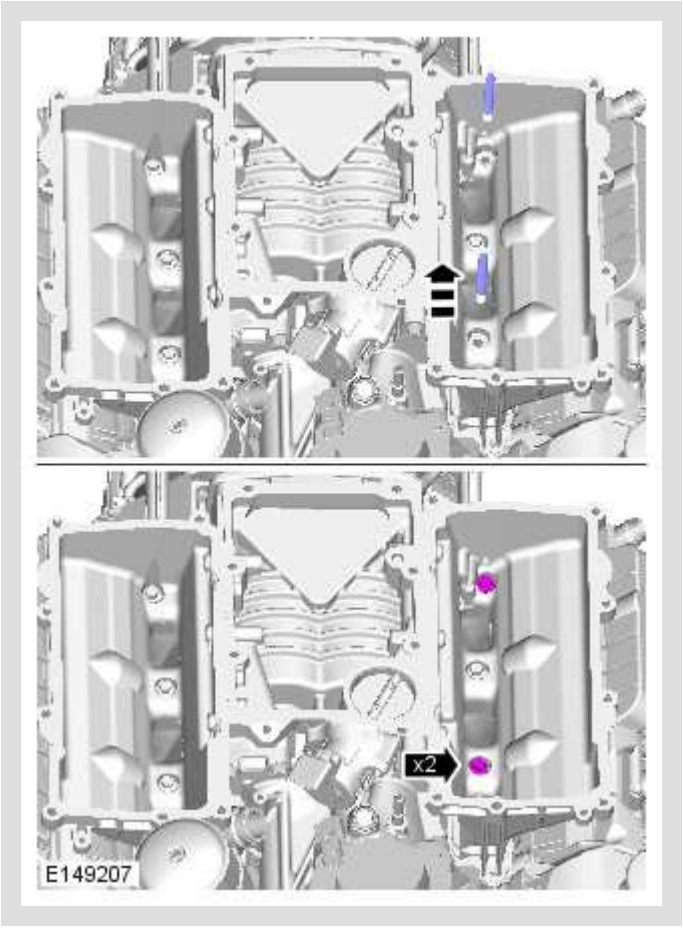


Special Tool(s): 303-1449-01 , 303-1449-02

Torque: **25 Nm**

10.

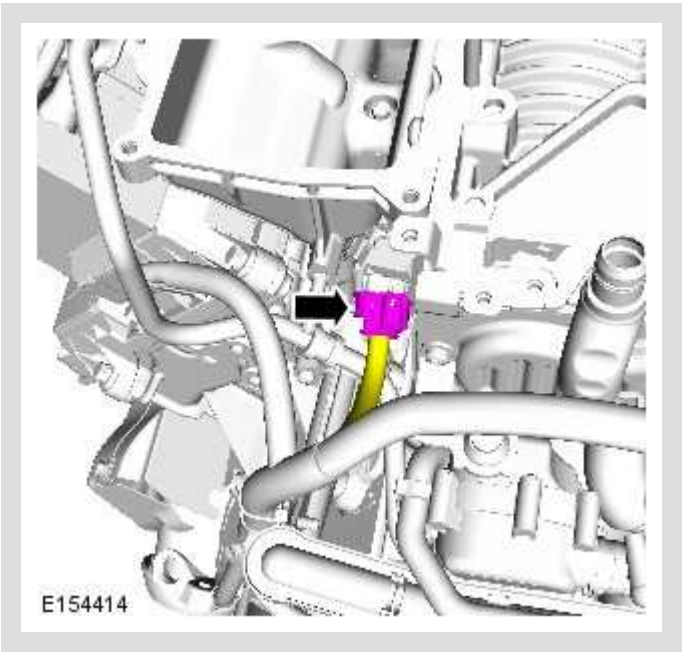
cardiagn.com



Special Tool(s): 303-1449-01 , 303-1449-02

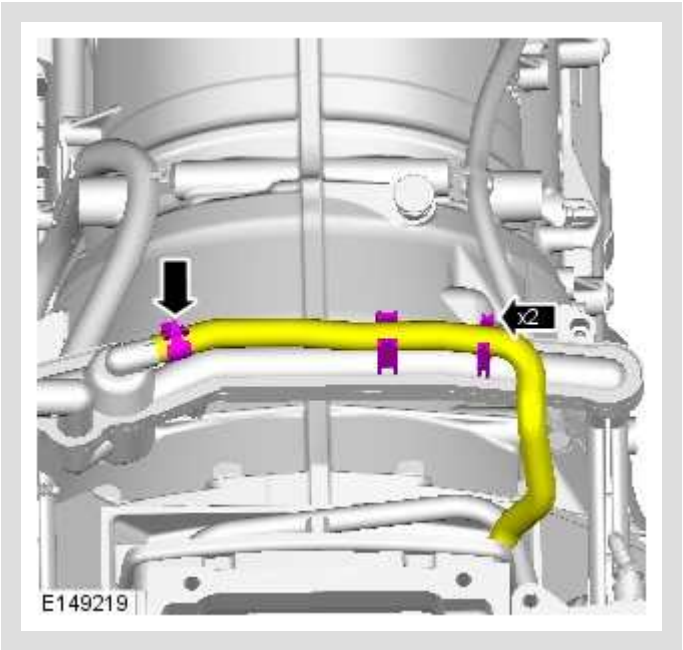
Torque: **25 Nm**

11.

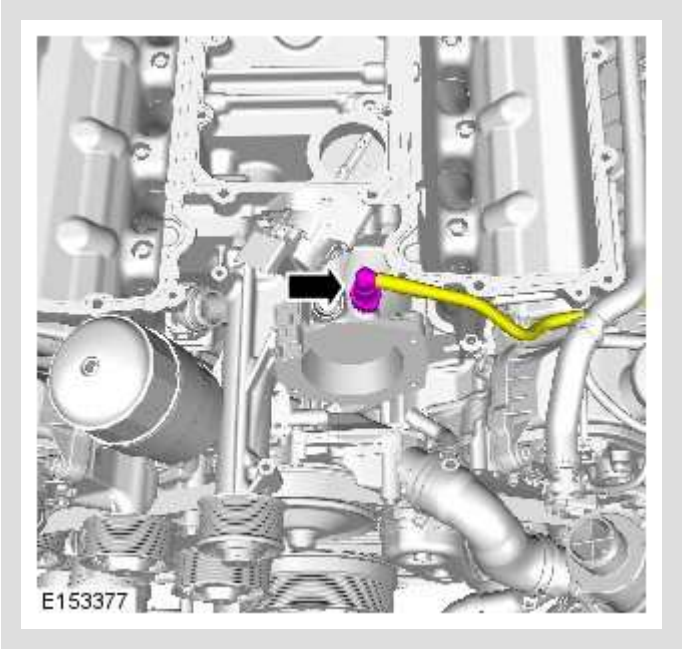


12.

cardiagn.com

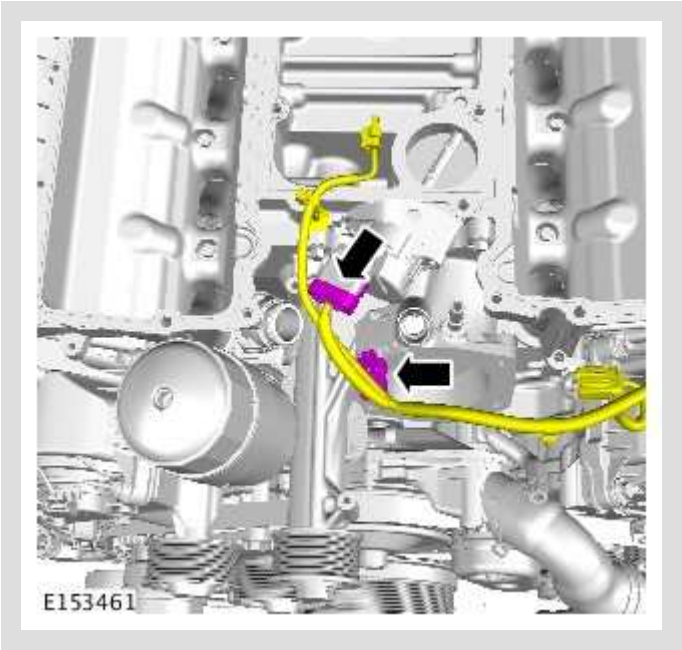


13.



14.

cardiagn.com



15. Refer to: Supercharger Belt (303-05B Accessory Drive - V8 S /C 5.0L Petrol, Removal and Installation).

16. Refer to: Throttle Body (303-04B Fuel Charging and Controls - V8 S/C 5.0L Petrol, Removal and Installation).

17. Refer to: Charge Air Cooler (303-12A Intake Air Distribution and Filtering - V6 S/C 3.0L Petrol, Removal and Installation).

18. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

cardiagn.com

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

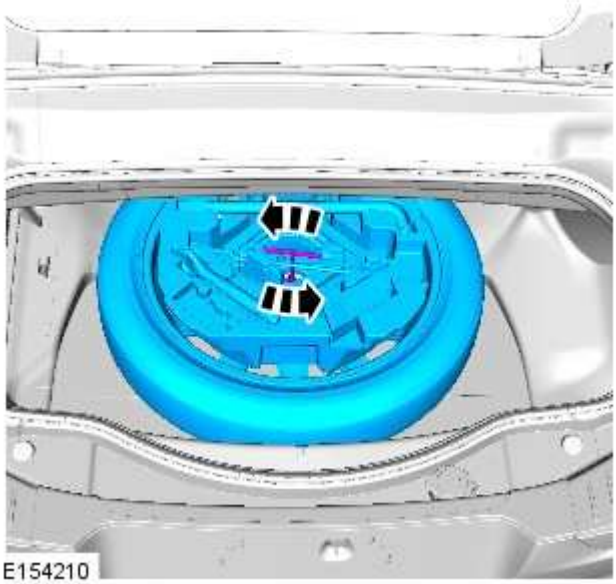
86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

NOTES:

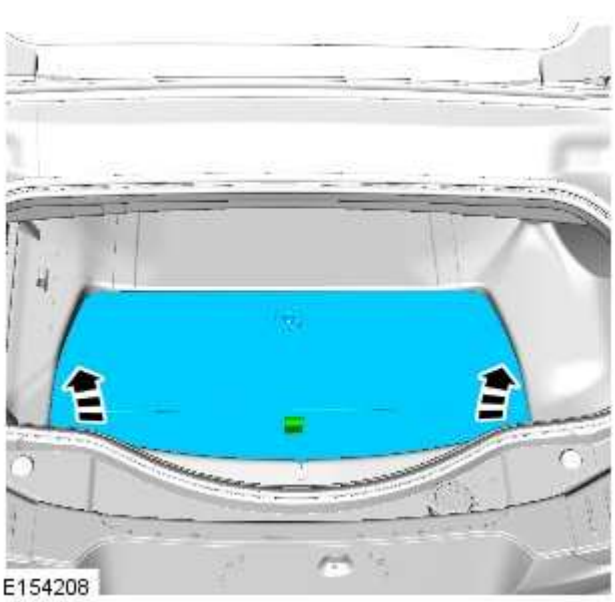
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.
- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).
2. Obtain and record the audio unit preset radio frequencies.
3.

cardiagn.com

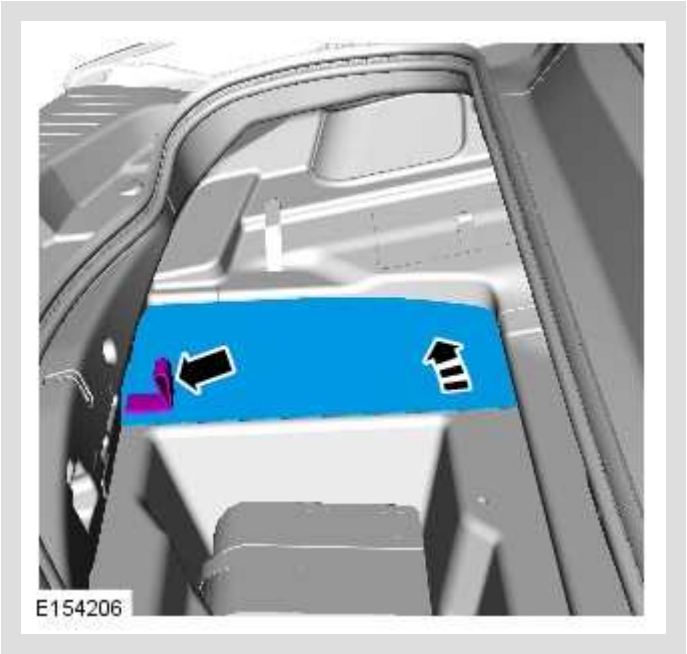

E154210

4.


E154208

5.

cardiagn.com

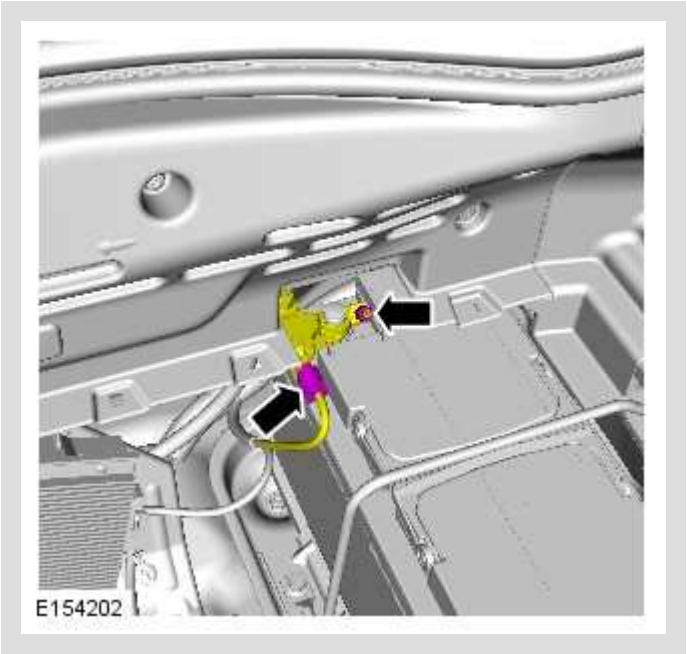


6.

CAUTION:

Take extra care not to damage the wiring harnesses.

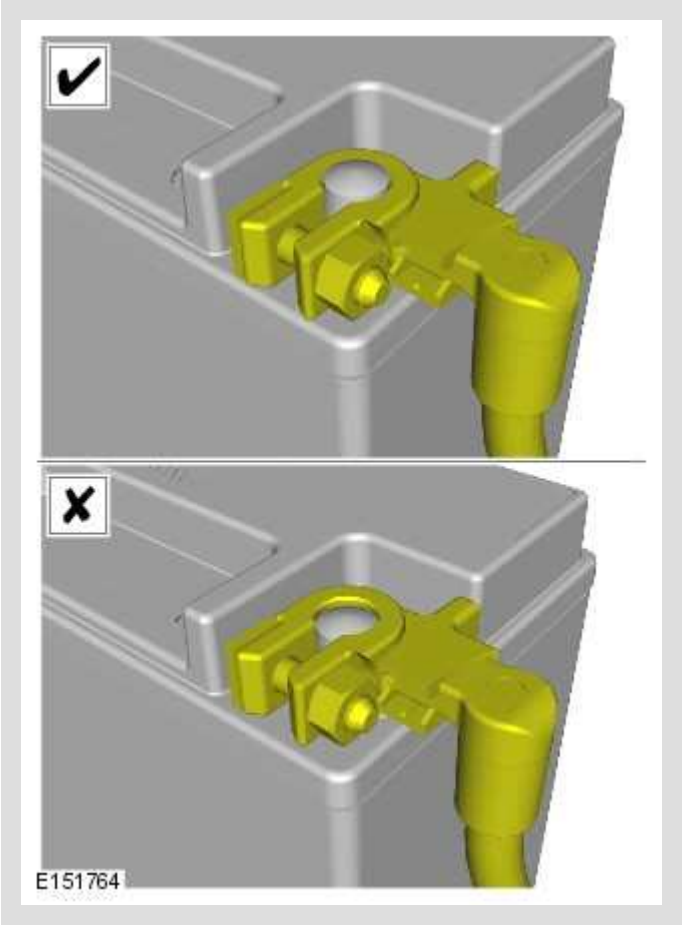
cardiagn.com



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

This step is only necessary when installing a new battery.

cardiagn.com

Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com

ENGINE - V6 S/C 3.0L PETROL

VALVES (G1666678)

REMOVAL AND INSTALLATION

12.29.62	VALVE - ENGINE SET - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	25.5	USED WITHINS	

REMOVAL

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

   Raise and support the vehicle.

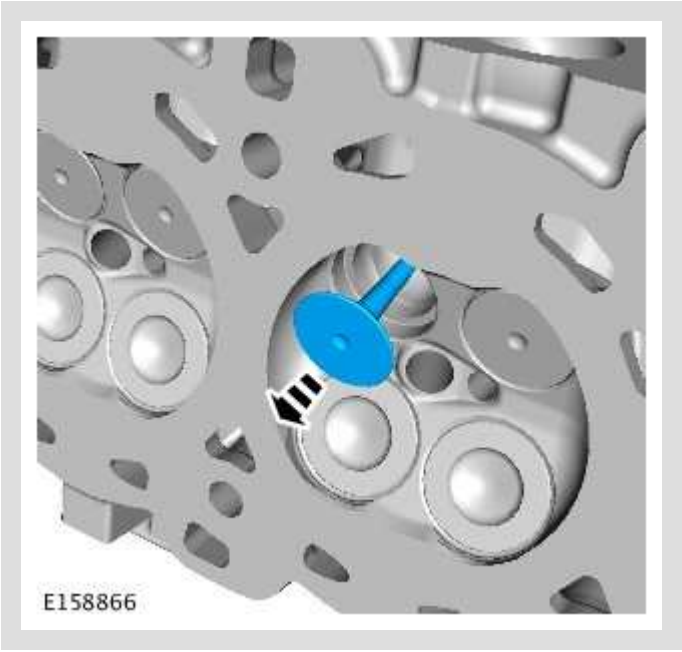
3. Refer to: Cylinder Head LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

4. Refer to: Cylinder Head RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

5.

cardiagn.com

6.



7.

cardiagn.com

8.

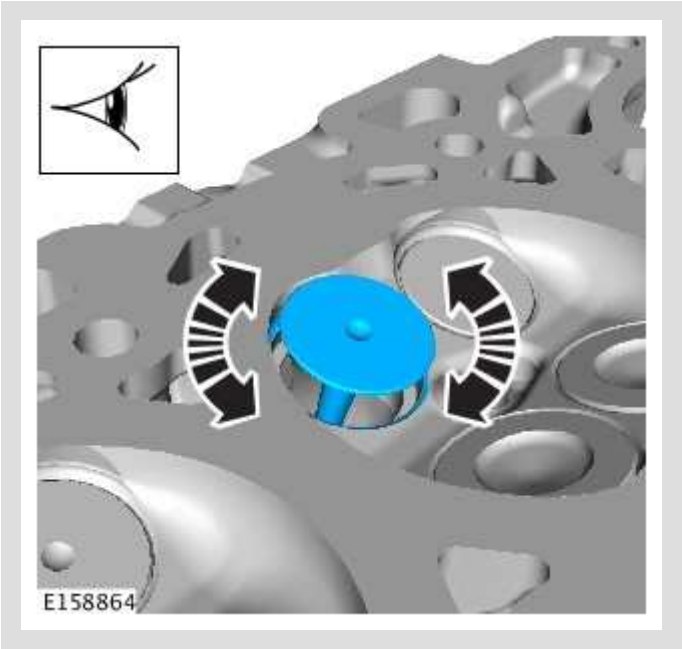
CAUTIONS:

Make sure that the area around the component is clean and free of foreign material.

Make sure the working surfaces are thoroughly clean to avoid contamination of the sensitive components.

Make sure that the valve grinding paste is kept away from the valve stem.

cardiagn.com



Place a small amount of fine valve grinding paste evenly around the contact face of the valve.

Place the valve in position and, using a suitable valve grinding tool, rotate the valve back and forth a few degrees on its seat, using light pressure.

Raise the valve frequently during lapping and turn it into a new position after a few laps or rotations.

Lap only until a continuous but narrow lapping mark is visible on both the valve seat and valve face.

Thoroughly clean all surfaces to remove traces of valve grinding paste from the cylinder head, valve seat and valve face.

1. Repeat steps 5 to 8 for the remaining valves.

INSTALLATION

1.

cardiagn.com

CAUTION:

Make sure the working surfaces are thoroughly clean to avoid contamination of the sensitive components.

NOTE:

Make sure that all the component mating faces are clean.

To install reverse the removal procedure.

CYLINDER HEAD RH (G1584106)

REMOVAL AND INSTALLATION

12.29.03	CYLINDER HEAD GASKET - RIGHT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	20.3	USED WITHINS	
12.29.12	CYLINDER HEAD - RIGHT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	20.3	USED WITHINS	

cardiagn.com

SPECIAL TOOL(S)

E129632	**303-1492** Guide Sleeve, Cylinder Head Bolt

REMOVAL

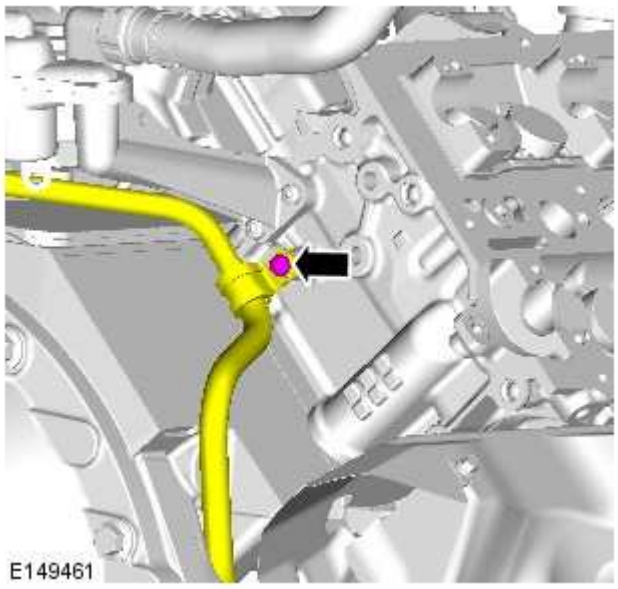
NOTES:

- Some illustrations may show the engine removed for clarity.
- Some variation in the illustrations may occur, but the essential information is always correct.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).
2. Raise and support the vehicle.
3. Refer to: Exhaust Manifold RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).
4. Refer to: Camshaft RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

cardiagn.com

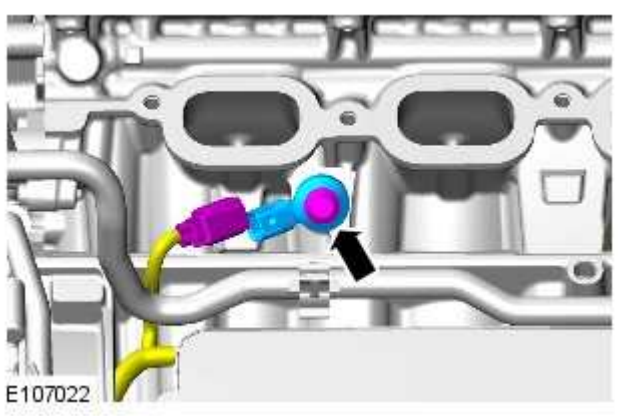
5.



6.

NOTE:

Some variation in the illustrations may occur, but the essential information is always correct.

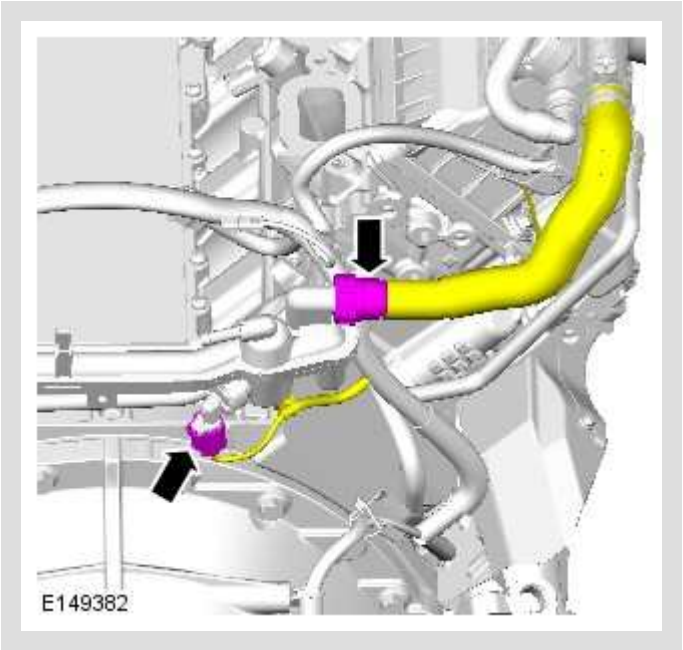


7.

NOTE:

Clamp the hose to minimize coolant loss.

cardiagn.com



8.

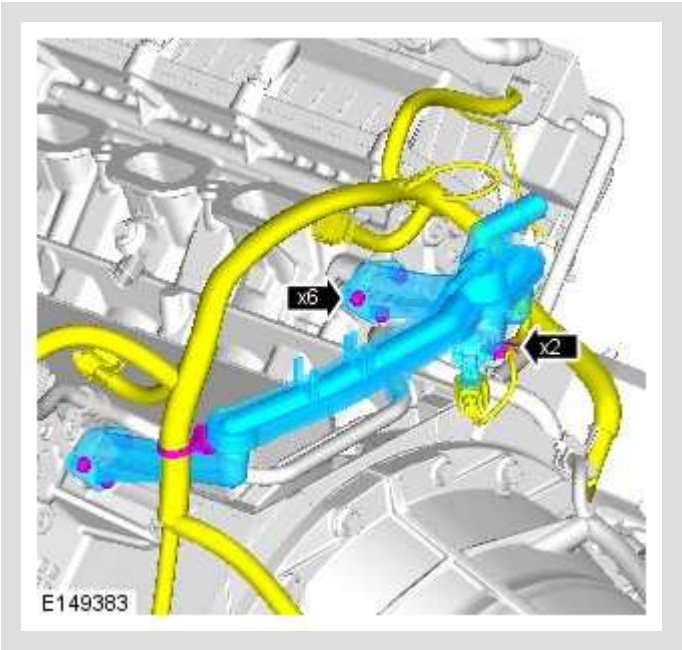
CAUTION:

Discard the seals.

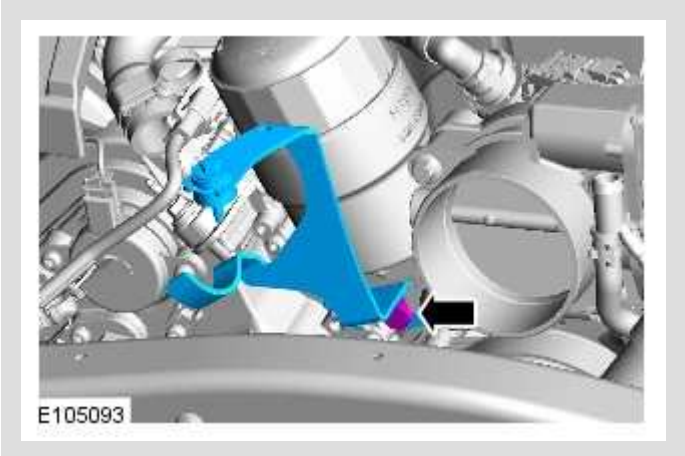
NOTE:

Be prepared to collect escaping coolant.

cardiagn.com



9.

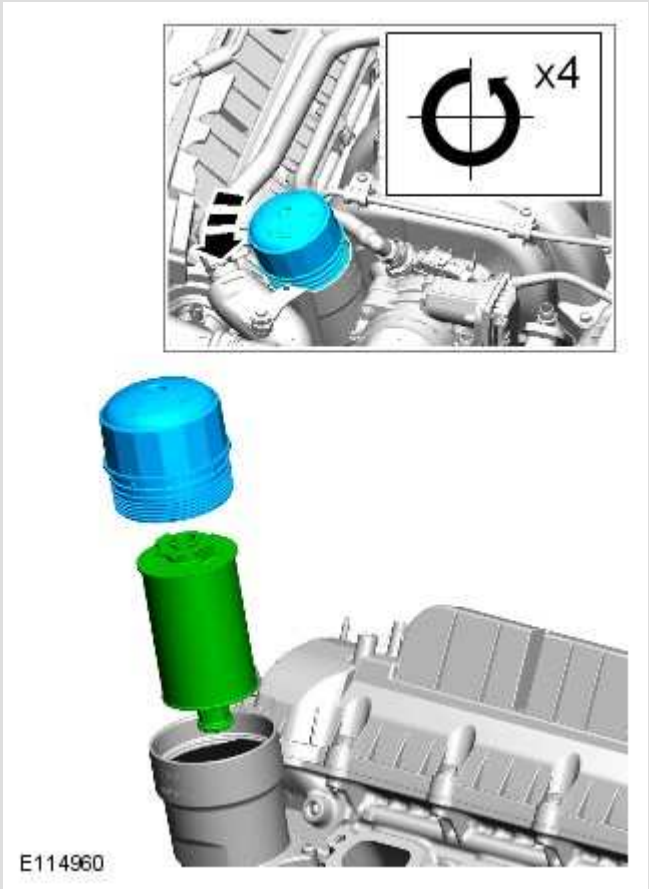


10.

cardiagn.com

NOTE:

Remove and discard the O-ring seal.

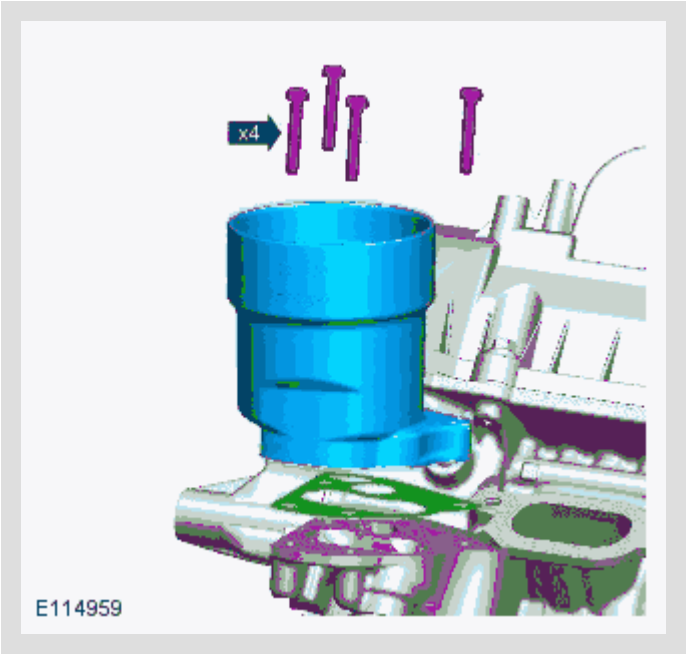


11.

NOTE:

Discard the gasket.

cardiagn.com



12.

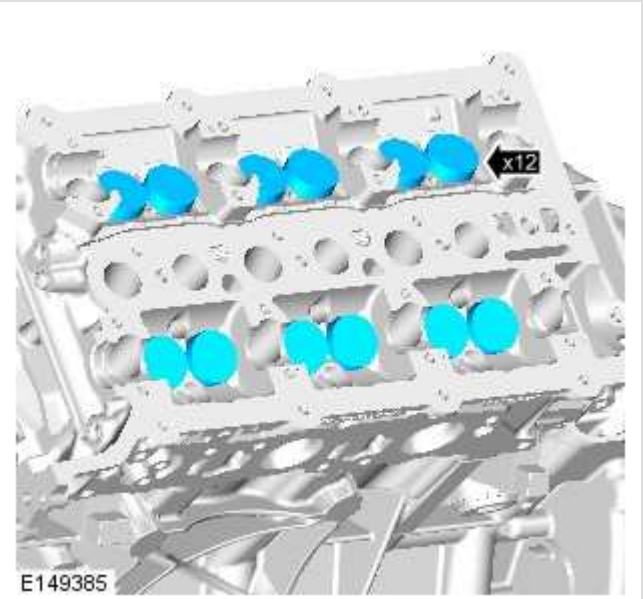
CAUTIONS:

- If a new cylinder head has been installed then new tappets must be installed.
- If the cylinder head is being removed without a new component being installed, the tappets must be installed in their original positions.

NOTE:

Left-hand shown, right-hand similar.

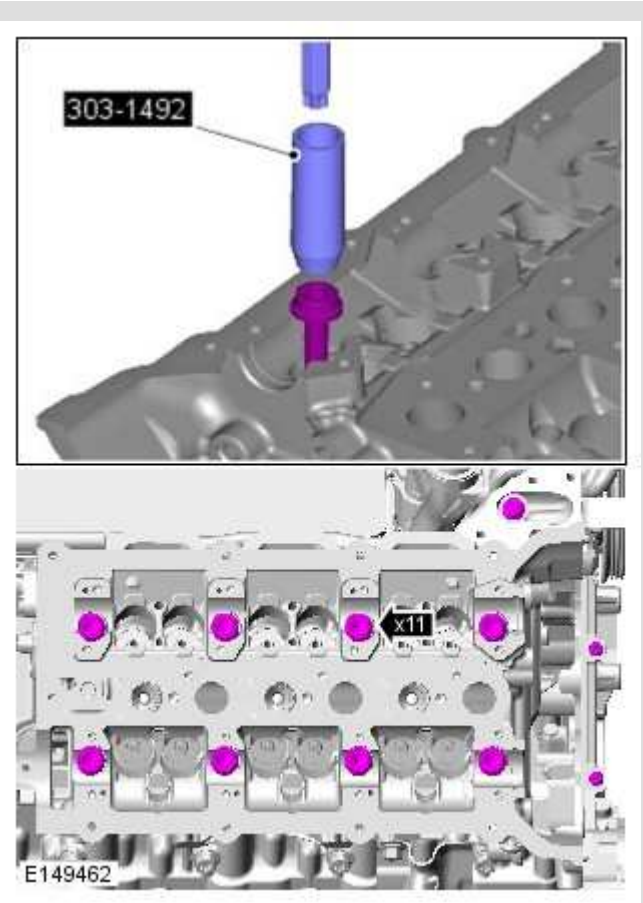
cardiagn.com



13.

CAUTION:

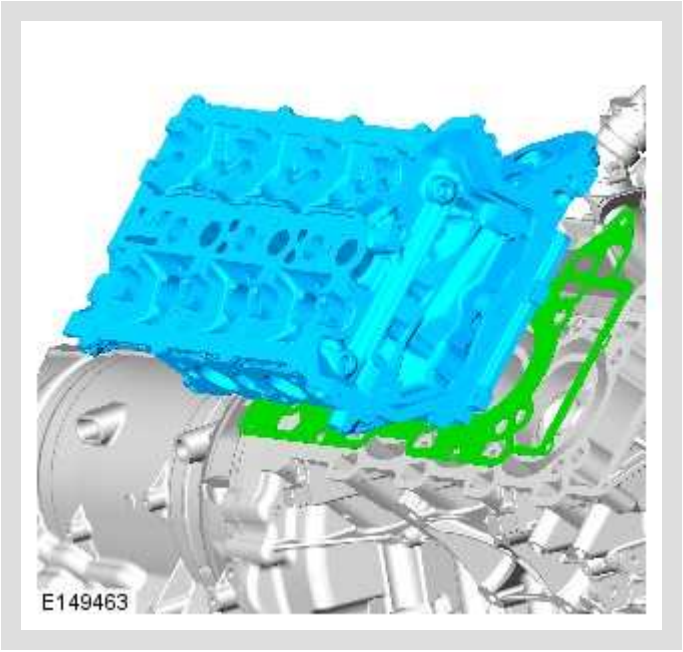
Discard the bolts.



Special Tool(s): 303-1492

cardiagn.com

14.



INSTALLATION

1.

CAUTION:

An acceptable flatness of the cylinder head is 0.1mm.

Check cylinder head face for distortion, across the center and from corner to corner.

2.

WARNING:

Make sure care is taken when handling the cylinder head gasket.

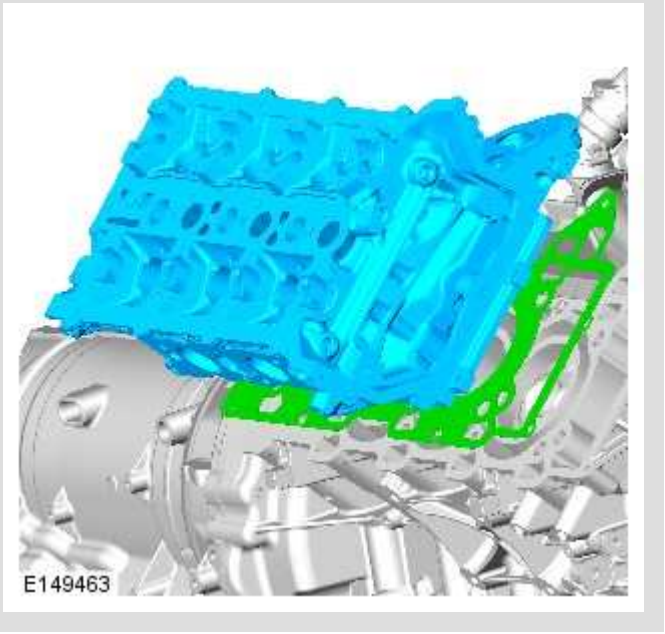
cardiagn.com

CAUTIONS:

- The head gasket must be installed over the cylinder block dowels.
- Make sure that the mating faces are clean and free of foreign material.

NOTE:

Install a new cylinder head gasket.



3.

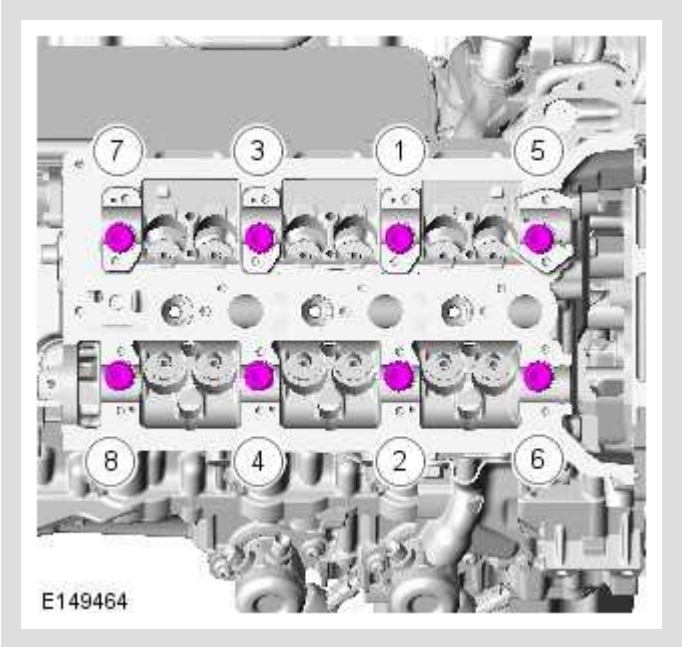
CAUTION:

Make sure that new cylinder head bolts are installed.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com

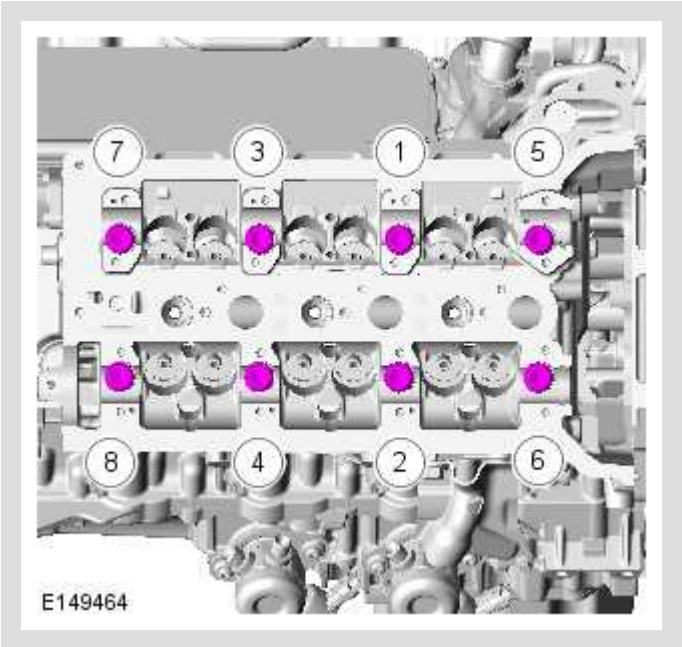


Torque: **20 Nm**

4.

NOTE:

Tighten the bolts in the indicated sequence.



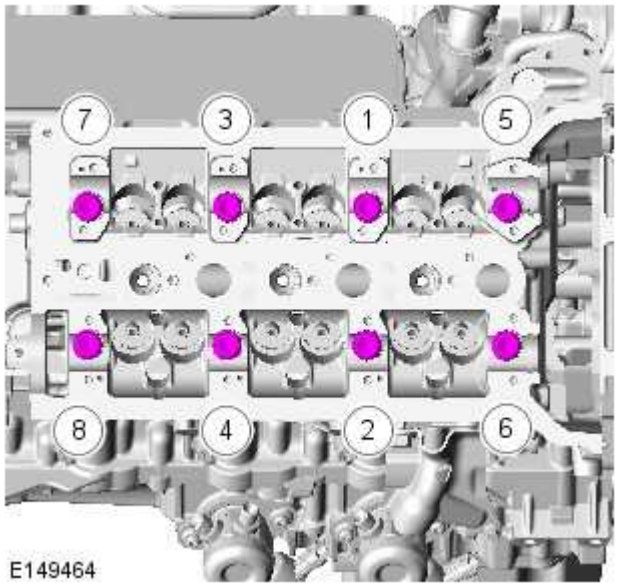
Torque: **35 Nm**

5.

cardiagn.com

NOTE:

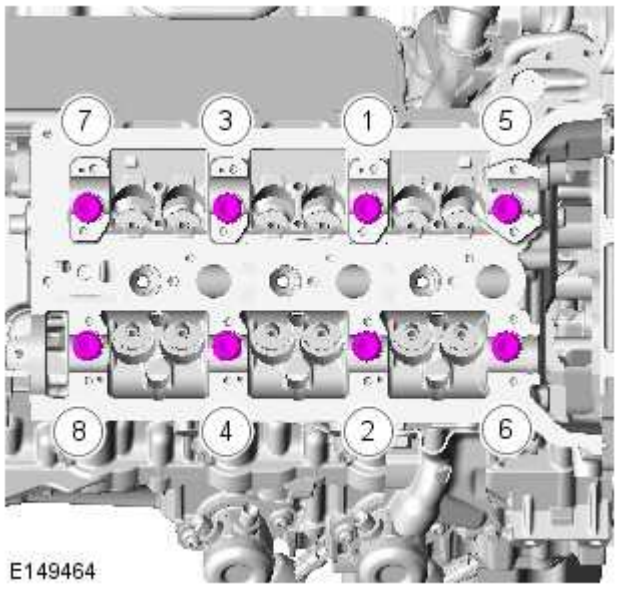
Slacken the bolts in the sequence shown.



6.

NOTE:

Tighten the bolts in the indicated sequence.



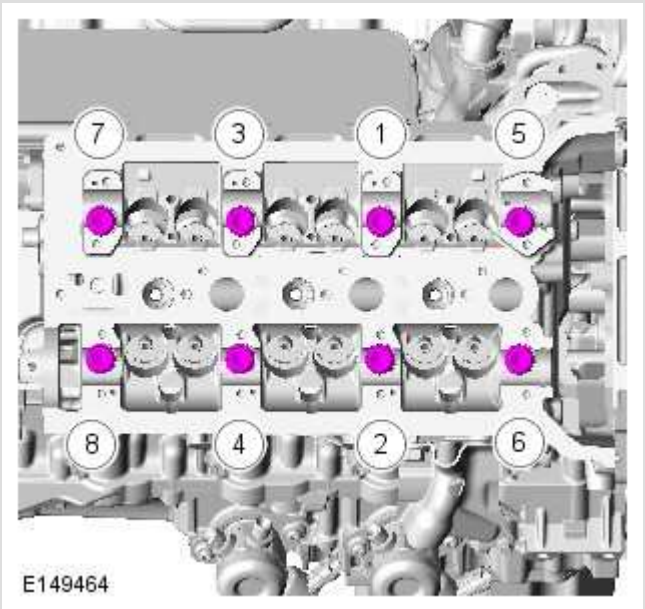
Torque: **35 Nm**

cardiagn.com

7.

NOTE:

Tighten the bolts in the indicated sequence.



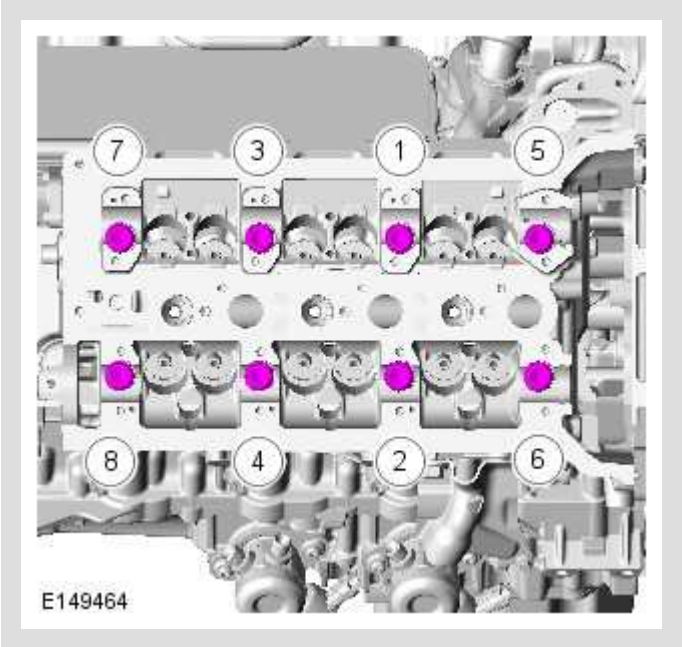
Tighten the bolts 1 to 8, a further 90 degrees.

8.

NOTE:

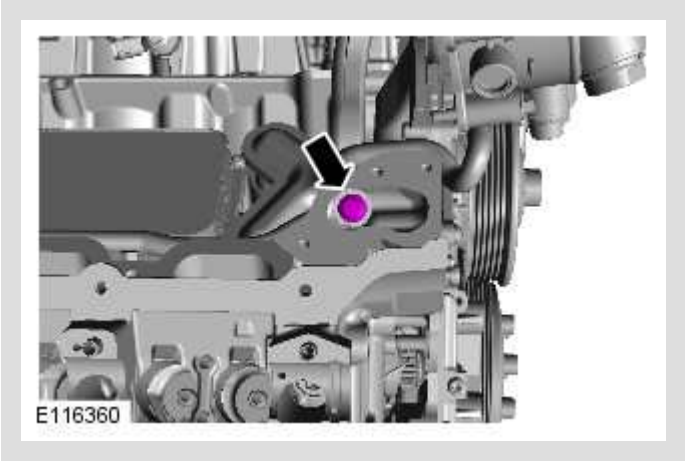
Tighten the bolts in the indicated sequence.

cardiagn.com



Tighten the bolts 1 to 8, a further 120 degrees.

9.



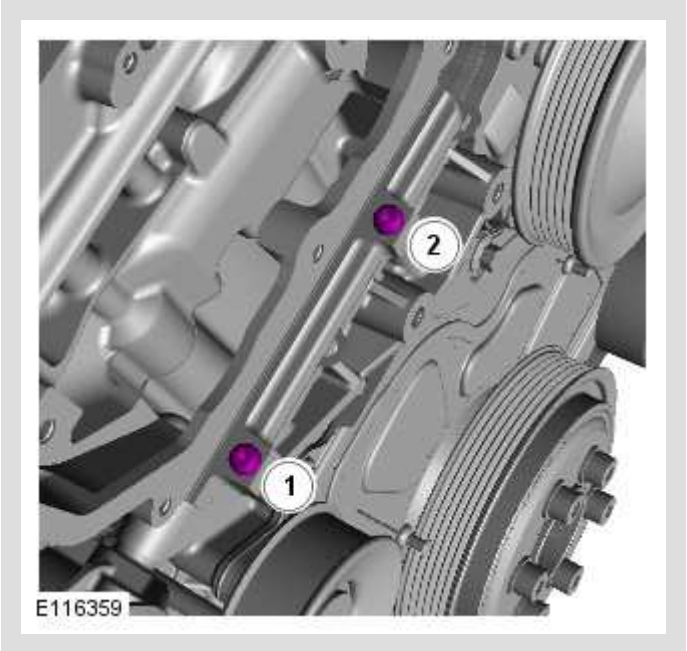
Torque: **25 Nm**

10.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com



Torque: **12 Nm**

11.

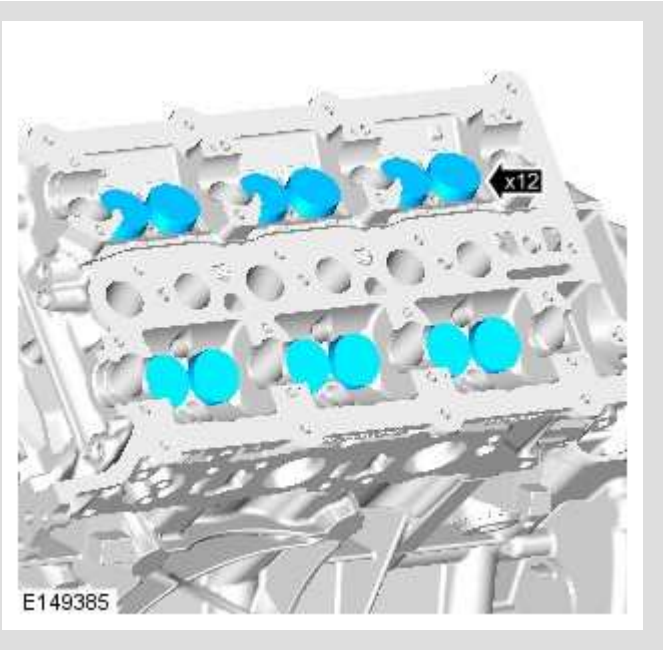
CAUTIONS:

- If a new cylinder head has been installed then new tappets must be installed.
- If the cylinder head is being removed without a new component being installed, the tappets must be installed in their original positions.

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Left-hand shown, right-hand similar.

cardiagn.com

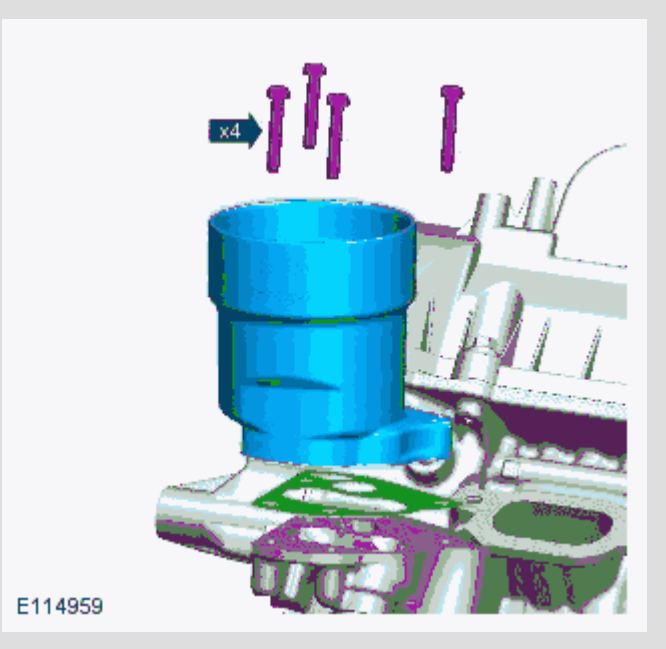


Lubricate the valve tappets with clean engine oil.

12.

NOTE:

Install a new gasket.



Torque: **12 Nm**

13.

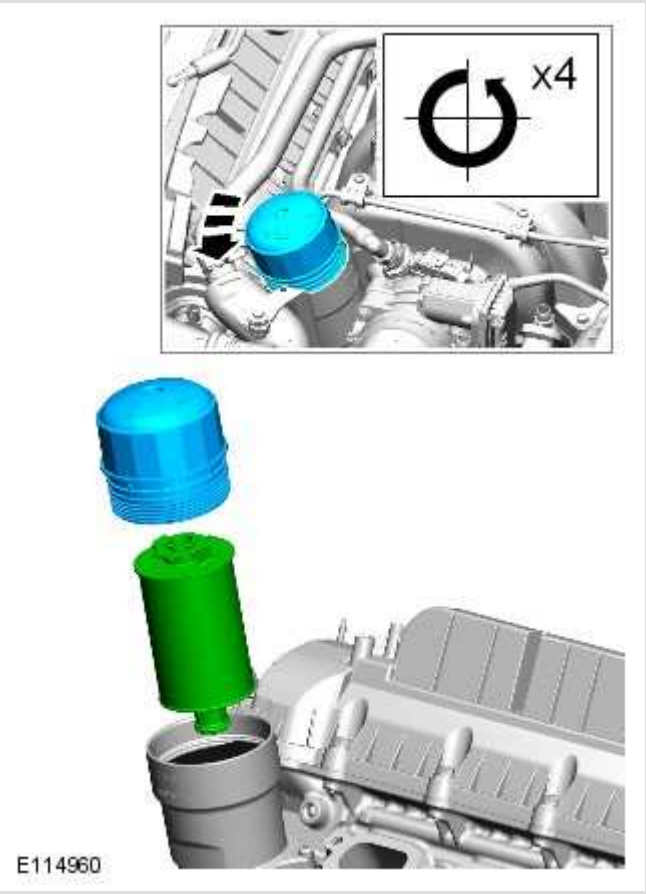
CAUTION:

cardiagn.com

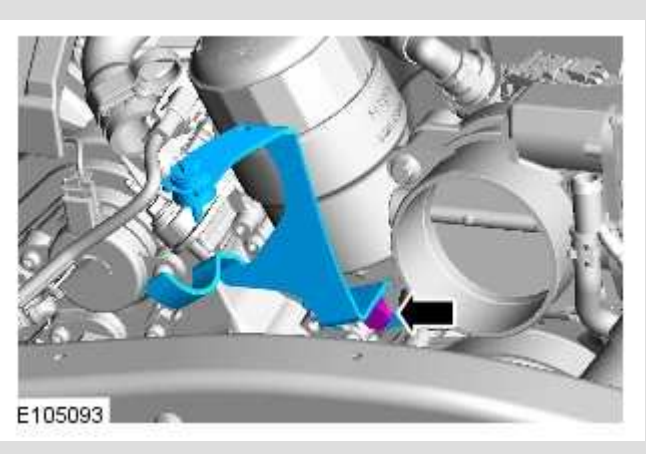
A new O-ring seal is to be installed.

NOTE:

Install a new engine oil filter.



14.

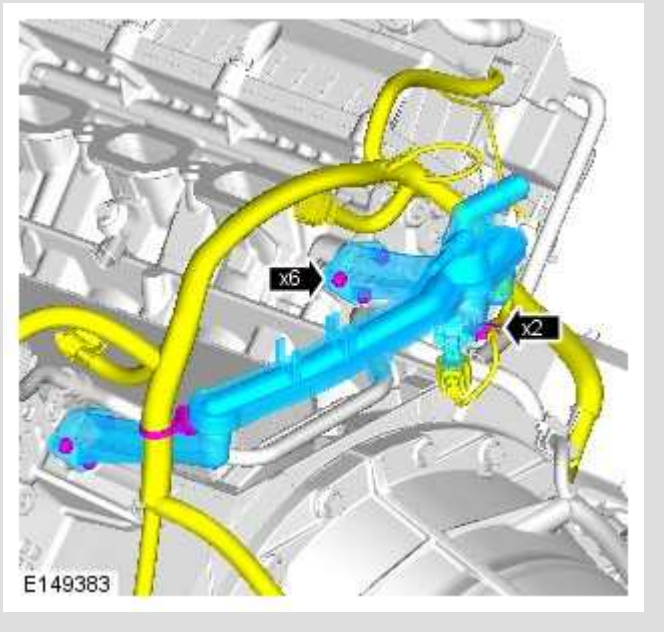


Torque: **10 Nm**

cardiagn.com

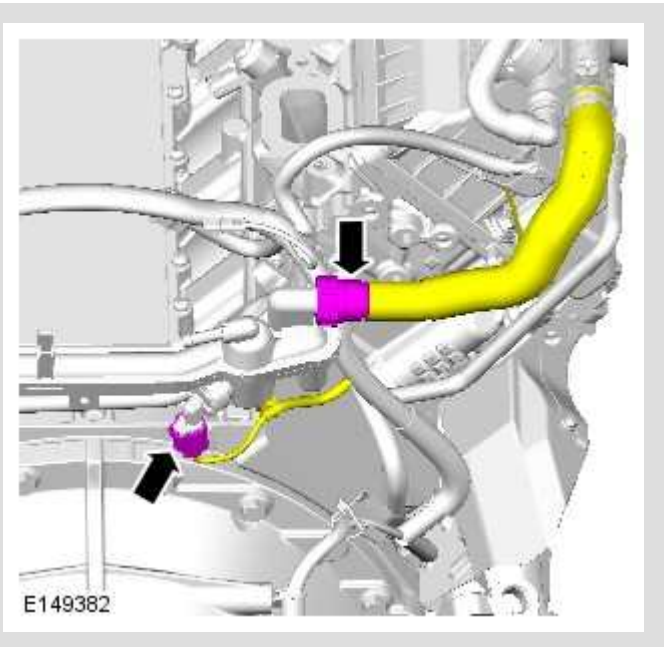
15. **CAUTION:**

Install the new seals.



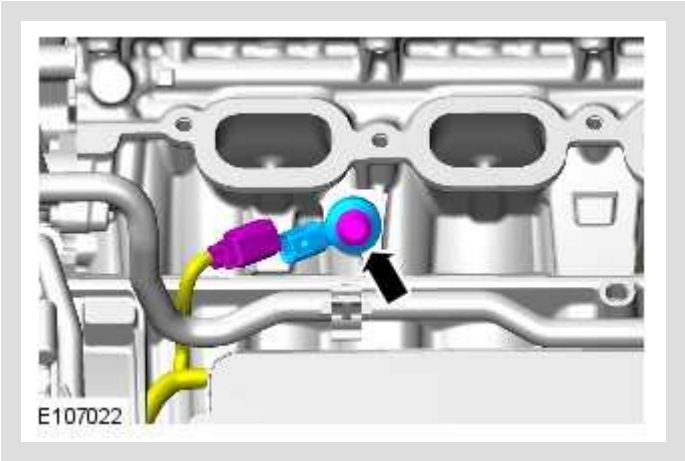
Torque: **10 Nm**

16.



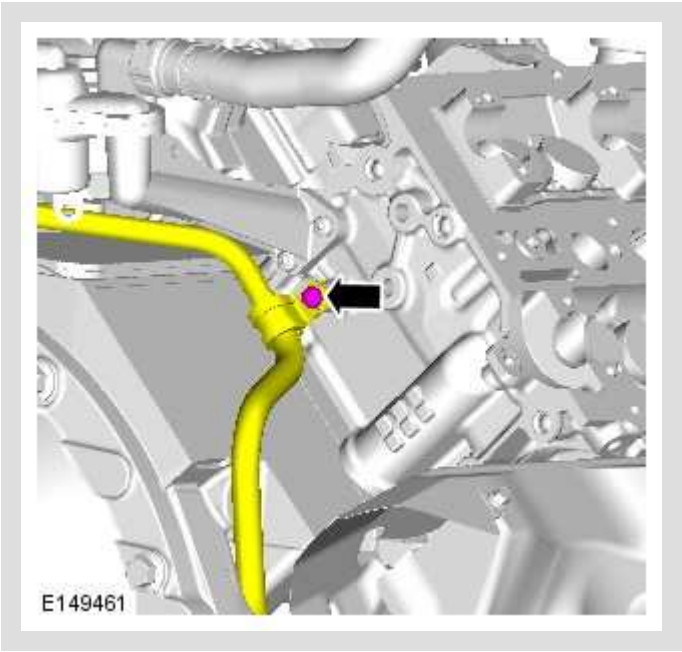
17.

cardiagn.com



Torque: **20 Nm**

18.



Torque: **10 Nm**

19. Refer to: Camshaft RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

20. Refer to: Exhaust Manifold RH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

21.

cardiagn.com

Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 303-01

ENGINE - V6 S/C 3.0L PETROL

CYLINDER HEAD LH (G1584105)

REMOVAL AND INSTALLATION

12.29.02	CYLINDER HEAD GASKET - LEFT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	19.8	USED WITHINS	
12.29.11	CYLINDER HEAD - LEFT HAND - RENEW	RIGHT HAND DRIVE, 3000 CC, AJ V6 (AJ126)	19.8	USED WITHINS	
12.29.43	CAMSHAFT COVER - LEFT HAND - RENEW	3000 CC, AJ V6 (AJ126)	5.7	USED WITHINS	

SPECIAL TOOL(S)

cardiagn.com

E129632	**303-1492** Guide Sleeve, Cylinder Head Bolt

REMOVAL

NOTES:

- Some variation in the illustrations may occur, but the essential information is always correct.
- Engine shown removed for clarity.

1. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2. **WARNING:**

   Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

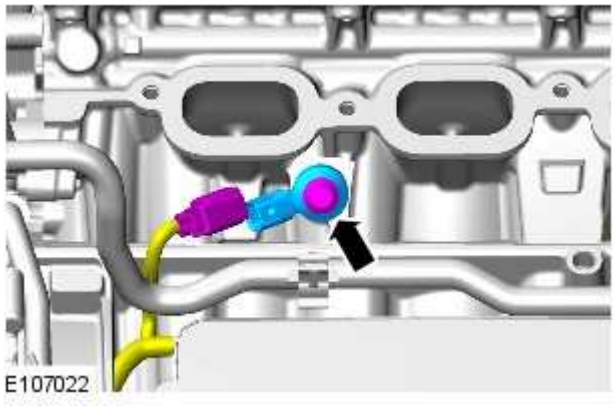
   Raise and support the vehicle.

3. Refer to: Exhaust Manifold LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

cardiagn.com

4. Refer to: Camshaft LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

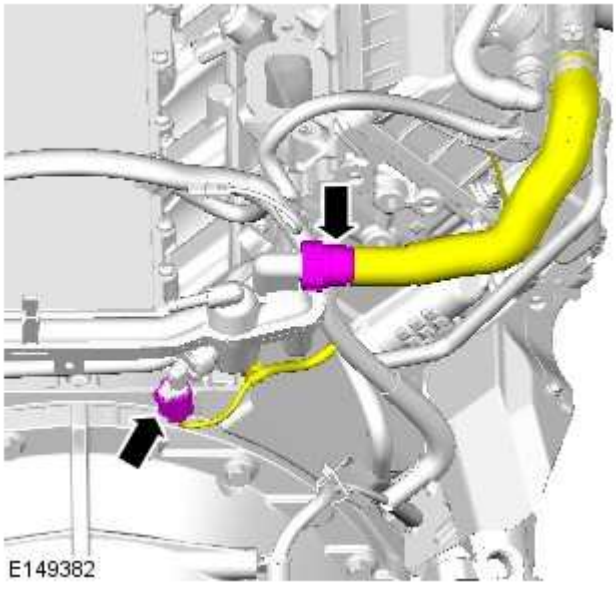
5.



6.

NOTE:

Clamp the hose to minimize coolant loss.

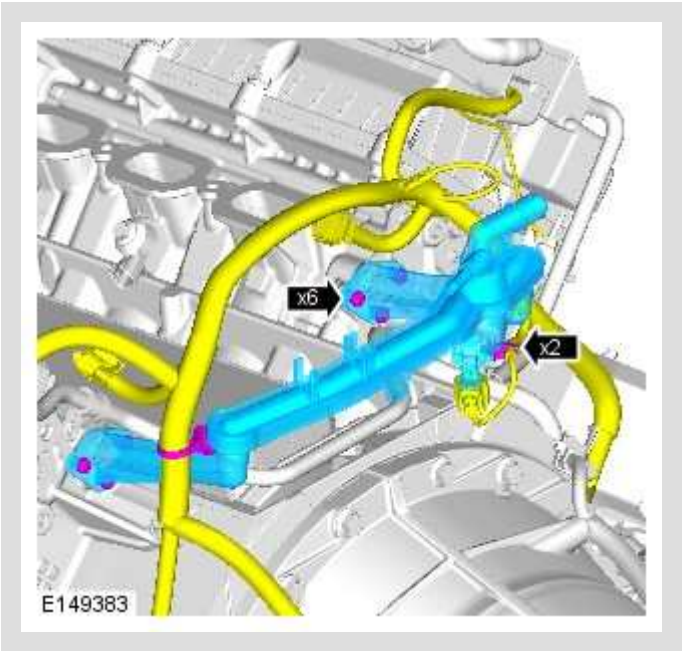


7.

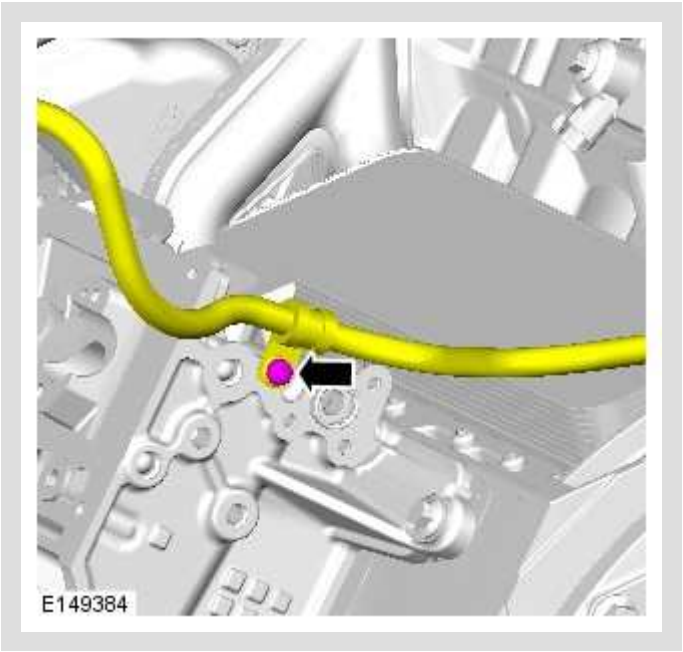
CAUTIONS:

- Be prepared to collect escaping coolant.
- Discard the seals.

cardiagn.com

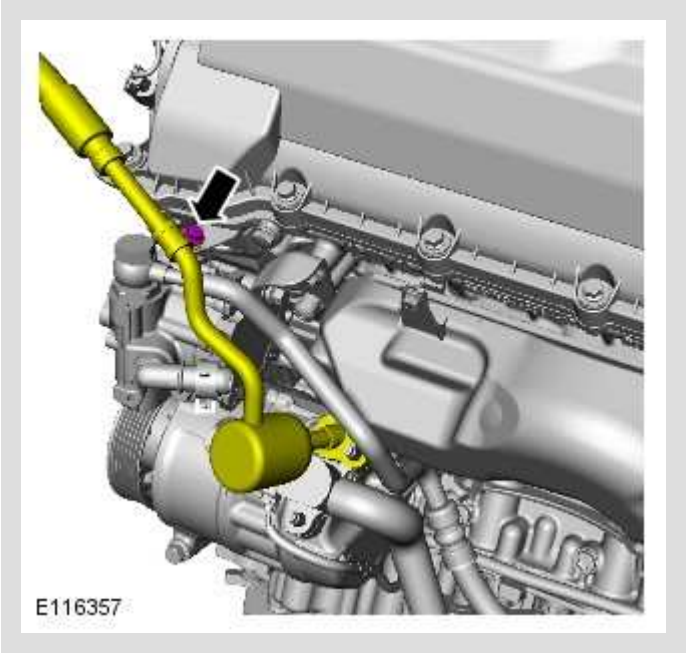


8.

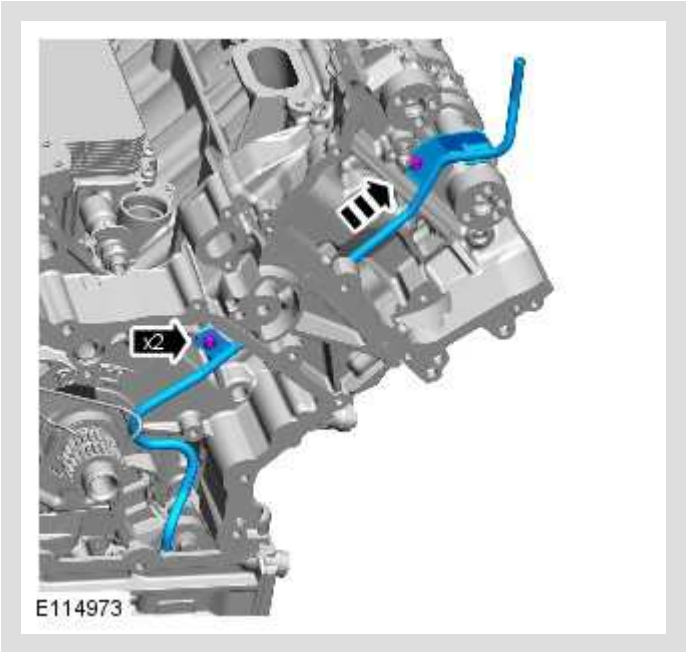


9.

cardiagn.com



10.

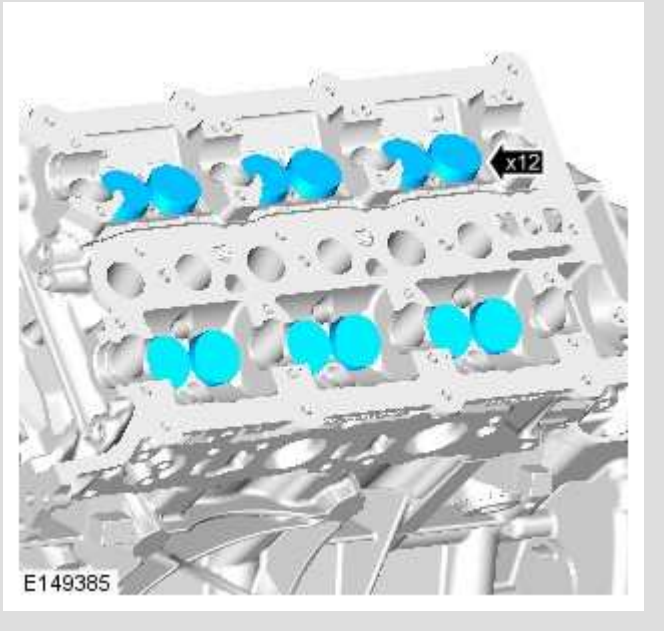


cardiagn.com

11.

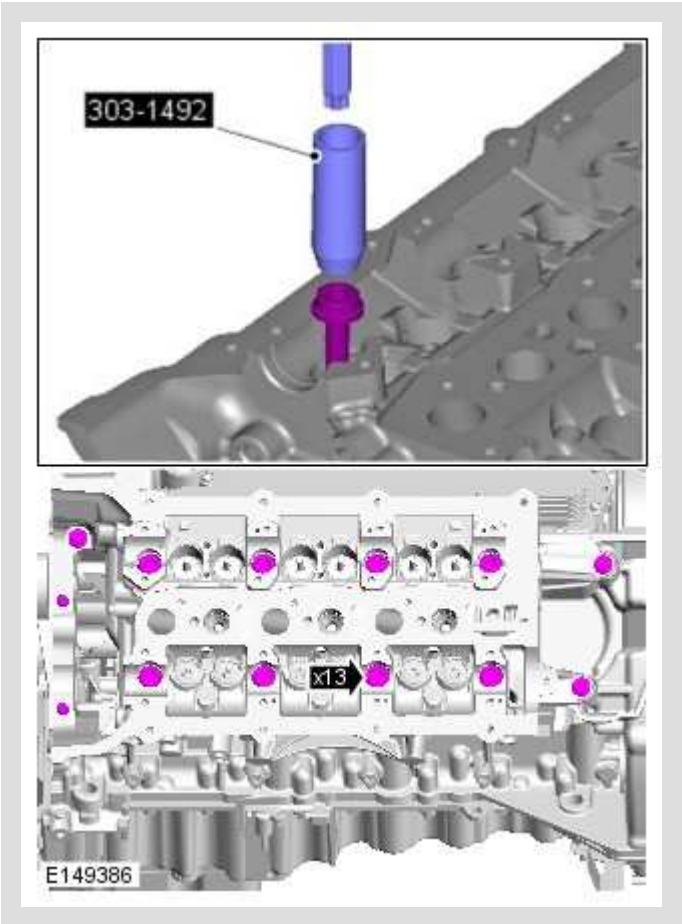
CAUTIONS:

- If a new cylinder head has been installed then new tappets must be installed.
- If the cylinder head is being removed without a new component being installed, the tappets must be installed in their original positions.



12.

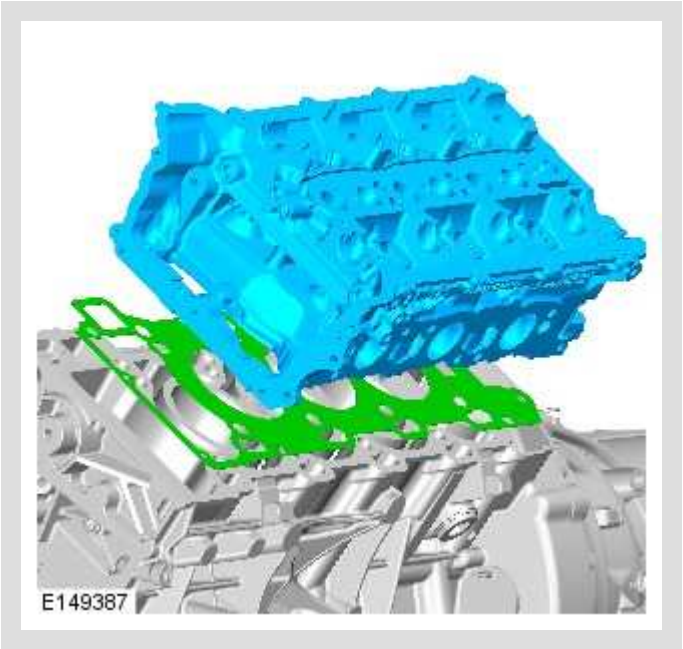
cardiagn.com



Special Tool(s): 303-1492

13.

cardiagn.com



INSTALLATION

1.

CAUTION:

An acceptable flatness of the cylinder head is 0.1mm.

Check cylinder head face for distortion, across the center and from corner to corner.

2.

WARNING:

Make sure care is taken when handling the cylinder head gasket.

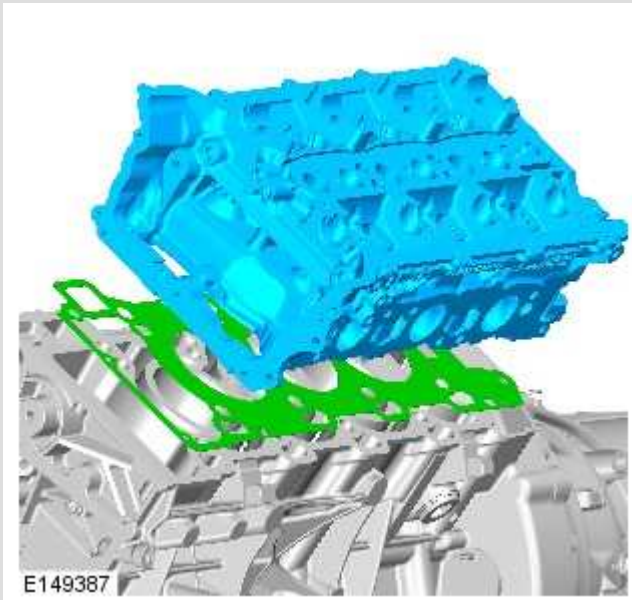
CAUTIONS:

cardiagn.com

- The head gasket must be installed over the cylinder block dowels.
- Make sure that the mating faces are clean and free of foreign material.

NOTE:

Install a new cylinder head gasket.



3.

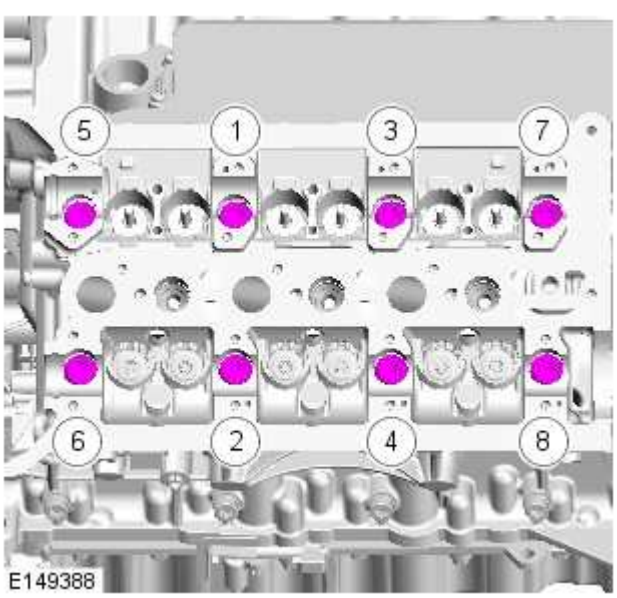
CAUTION:

Make sure that new cylinder head bolts are installed.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com

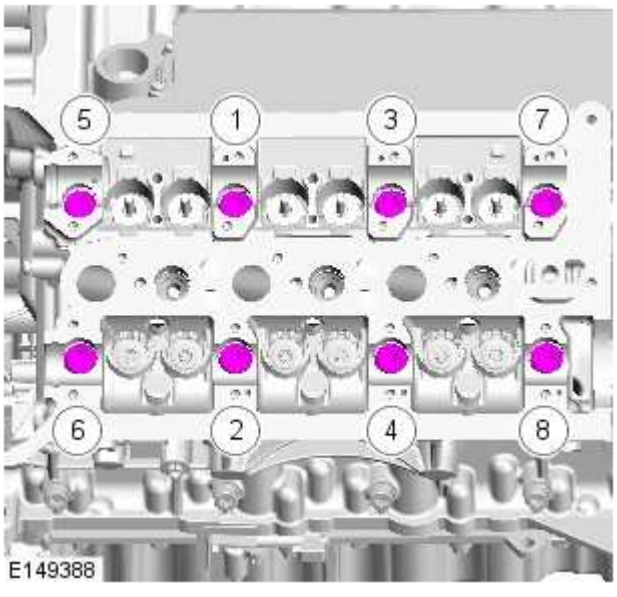


Torque: **20 Nm**

4.

NOTE:

Tighten the bolts in the indicated sequence.



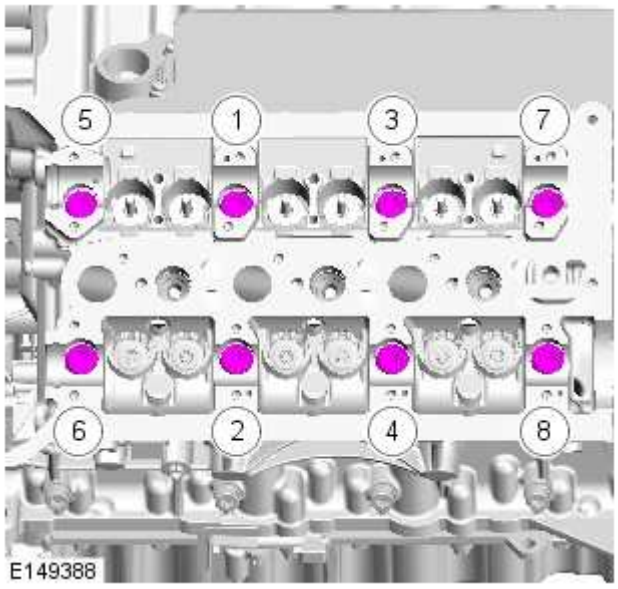
Torque: **35 Nm**

cardiagn.com

5.

NOTE:

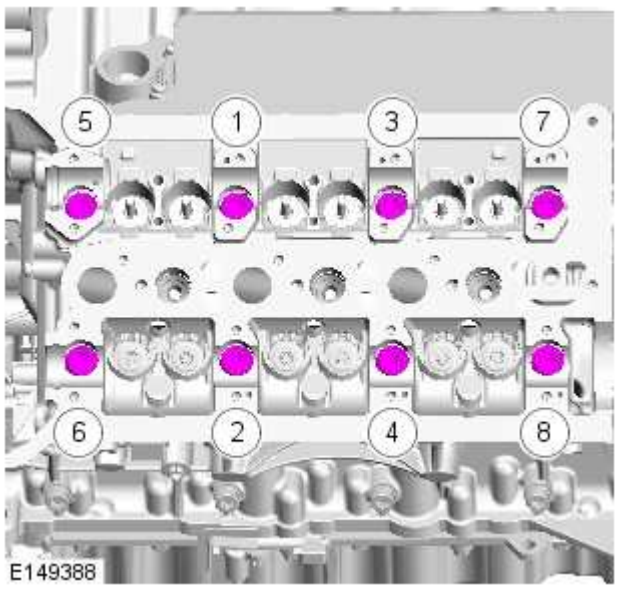
Slacken the bolts in the sequence shown.



6.

NOTE:

Tighten the bolts in the indicated sequence.



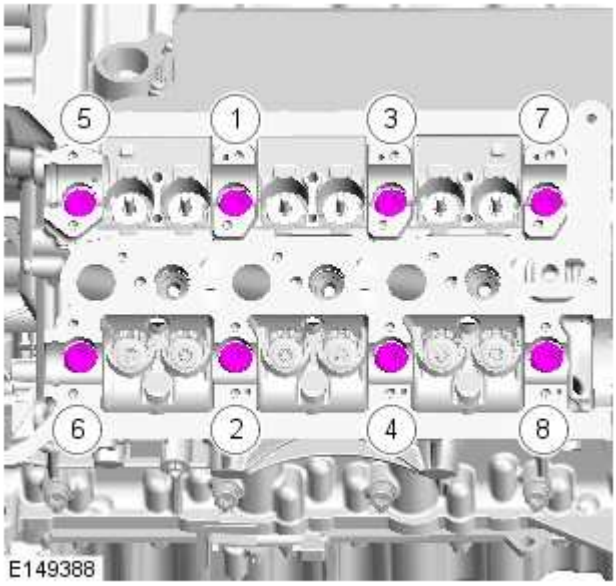
Torque: **35 Nm**

cardiagn.com

7.

NOTE:

Tighten the bolts in the indicated sequence.



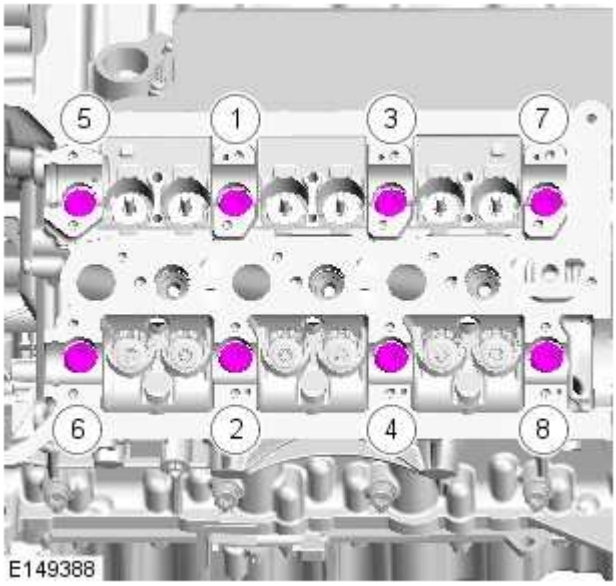
Tighten the bolts 1 to 8, a further 90 degrees.

8.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com

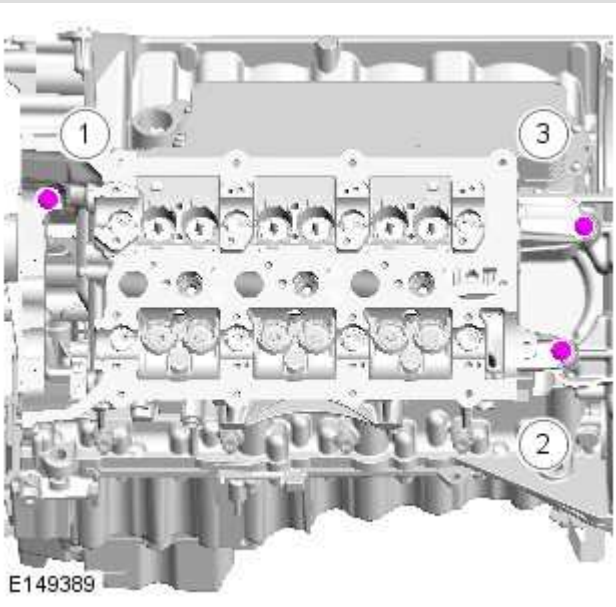


Tighten the bolts 1 to 8, a further 120 degrees.

9.

NOTE:

Tighten the bolts in the indicated sequence.



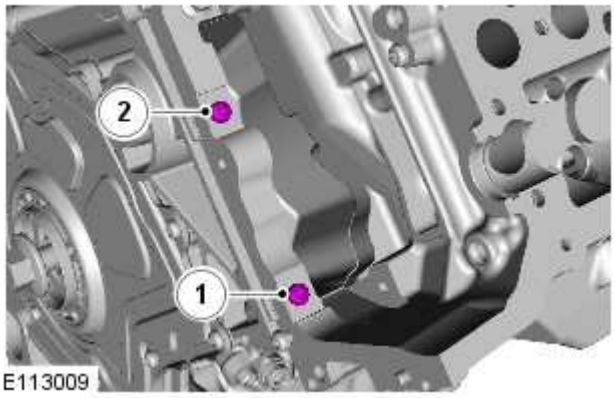
Torque: **25 Nm**

10.

NOTE:

Tighten the bolts in the indicated sequence.

cardiagn.com

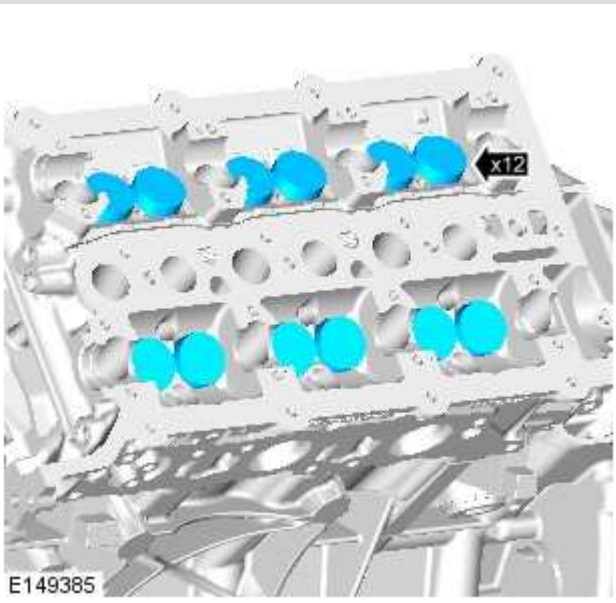


Torque: **12 Nm**

11.

CAUTIONS:

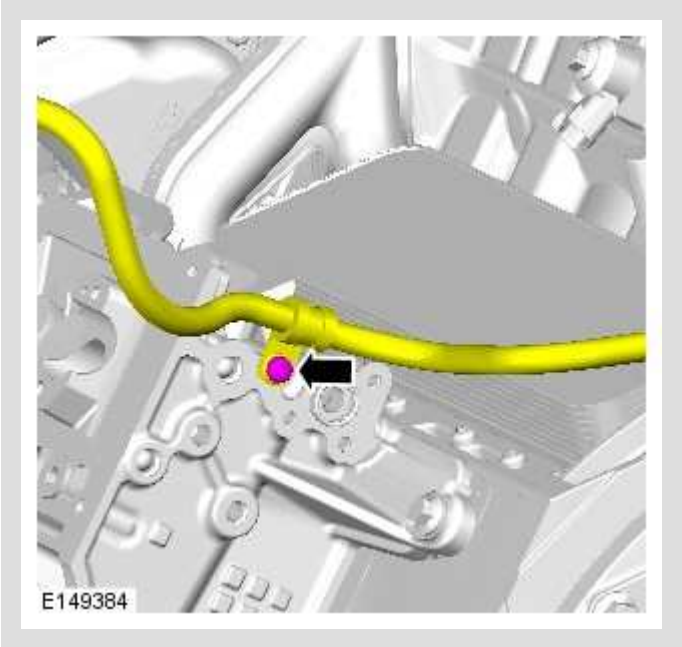
- If a new cylinder head has been installed then new tappets must be installed.
- If the cylinder head is being removed without a new component being installed, the tappets must be installed in their original positions.



Lubricate the valve tappets with clean engine oil.

12.

cardiagn.com

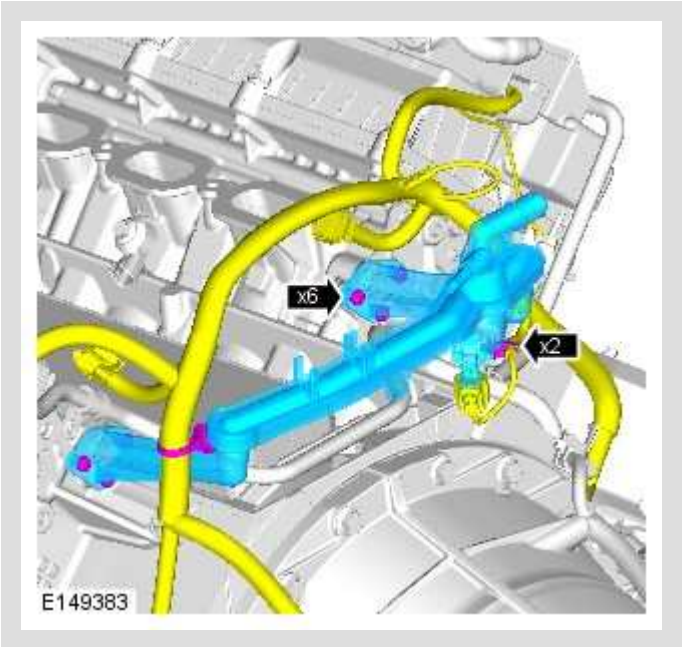


Torque: **10 Nm**

13.

CAUTION:

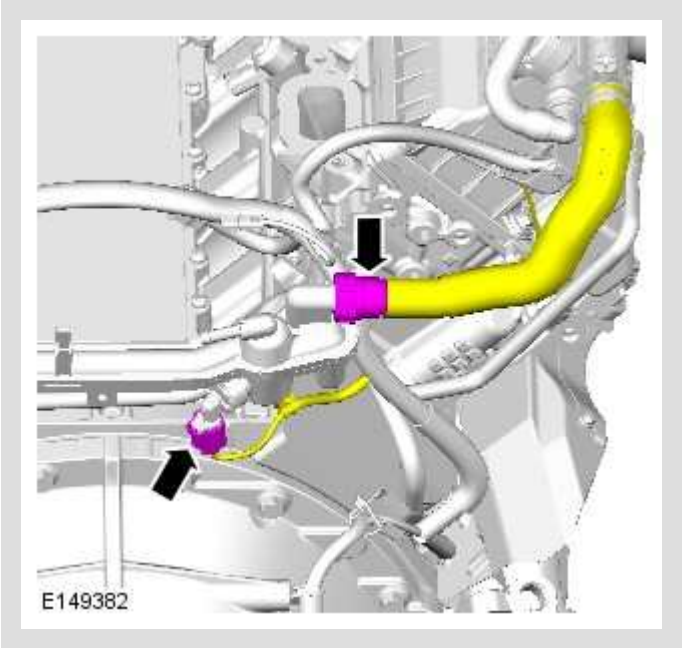
Install the new seals.



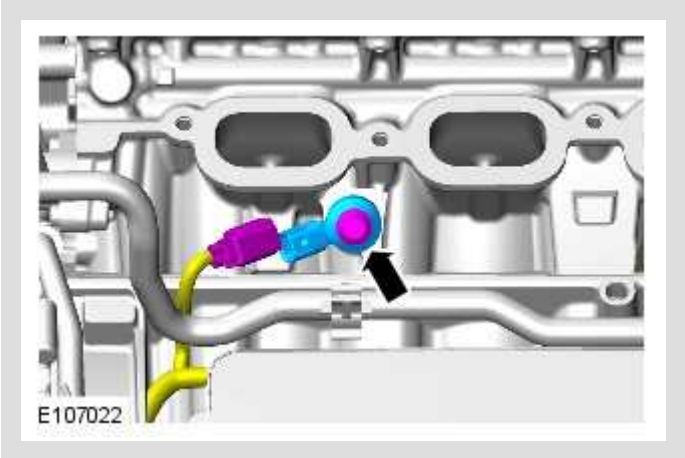
Torque: **10 Nm**

14.

cardiagn.com



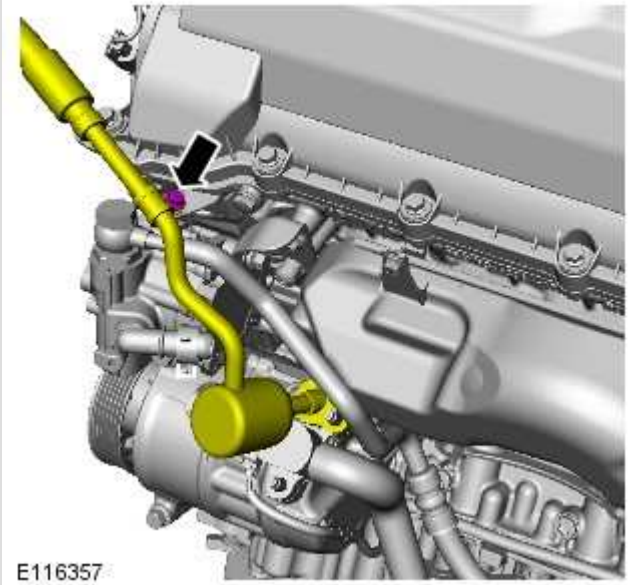
15.



Torque: **20 Nm**

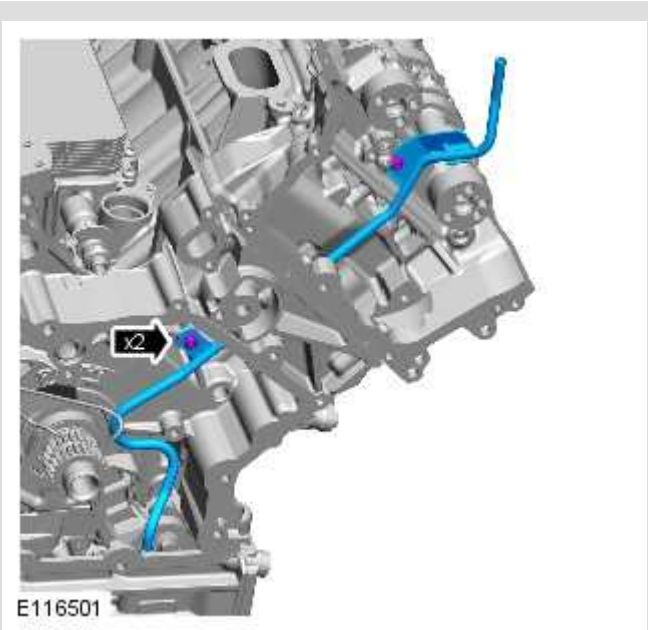
16.

cardiagn.com



Torque: **12 Nm**

17.



cardiagn.com

Torque: **12 Nm**

18. Refer to: Camshaft LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

19. Refer to: Exhaust Manifold LH (303-01A Engine - V6 S/C 3.0L Petrol, Removal and Installation).

20. Refer to: Battery Disconnect and Connect (414-01 Battery, Mounting and Cables, General Procedures).

2015.0 F-TYPE (X152), 414-01

BATTERY, MOUNTING AND CABLES

BATTERY DISCONNECT AND CONNECT (G1579511)

GENERAL PROCEDURES

86.15.15	BATTERY DISCONNECTION AND RECONNECTION PROCEDURE **** DO NOT ISSUE ****	ALL DERIVATIVES	0.2	USED WITHINS

△ NOTES:

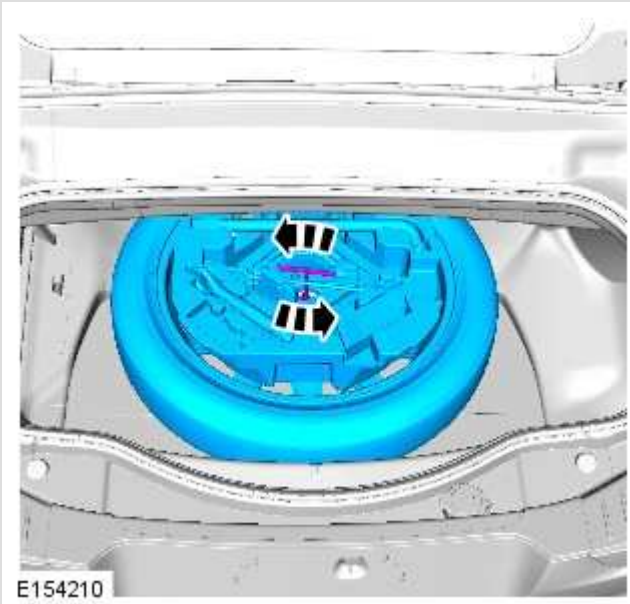
- Some variation in the illustrations may occur, but the essential information is always correct.
- Removal steps in this procedure may contain installation details.

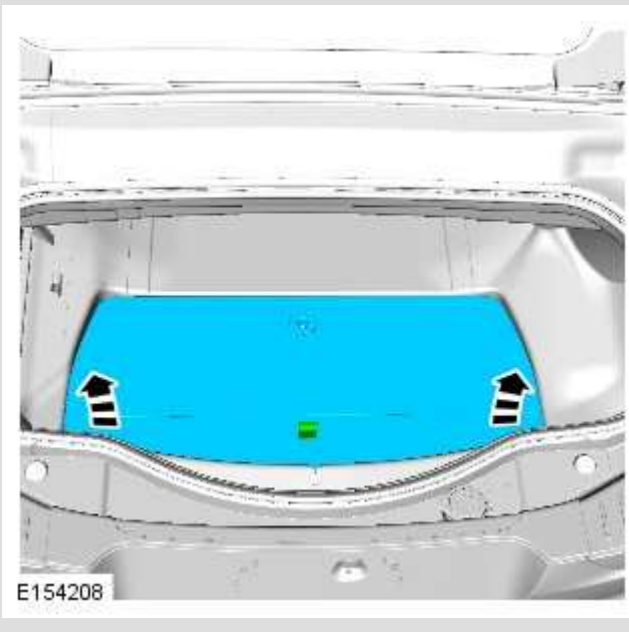
cardiagn.com

- If a new battery is installed, the battery monitoring system (BMS) must be reset using Jaguar approved diagnostic equipment.

1. Refer to: Battery Care Requirements (414-00 Battery and Charging System - General Information, Description and Operation).

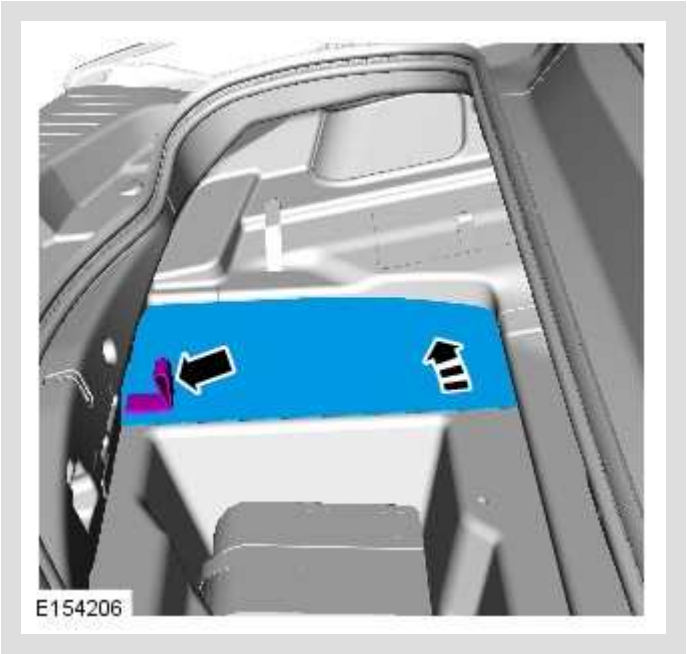
2. Obtain and record the audio unit preset radio frequencies.

3. 

4. 

cardiagn.com

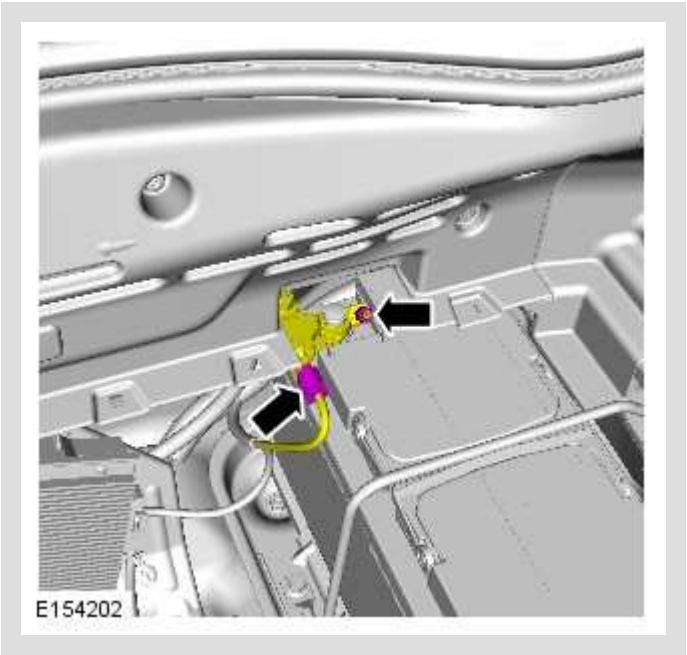
5.



6.

CAUTION:

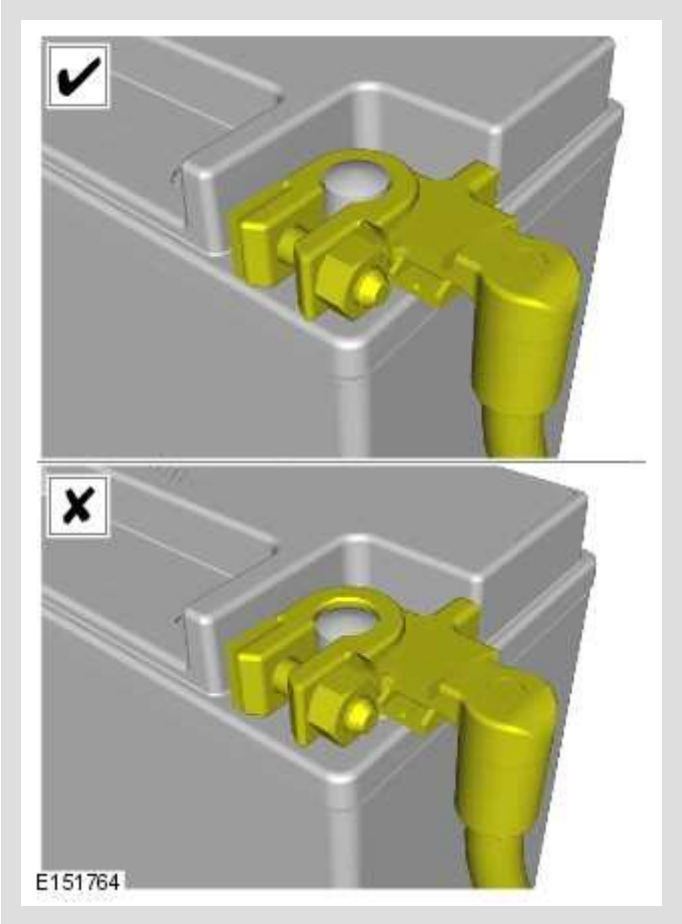
Take extra care not to damage the wiring harnesses.



Torque: **6 Nm**

7.

cardiagn.com



8. To install, reverse the removal procedure.

9. **NOTE:**

   This step is only necessary when installing a new battery.

   Using Jaguar approved diagnostic equipment, reset the battery monitoring system (BMS).

10. Door Window Motor Initialization

11. Enter the audio unit preset radio frequencies.

cardiagn.com

12. Reset the clock to the correct time.

13. Start the engine and allow to idle until the engine reaches normal operating temperature.

14. Switch the engine off.

cardiagn.com